THE OTB

THE OLD TIMER'S BULLETIN FEBRUARY 2000 VOL. 41 / #1

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator

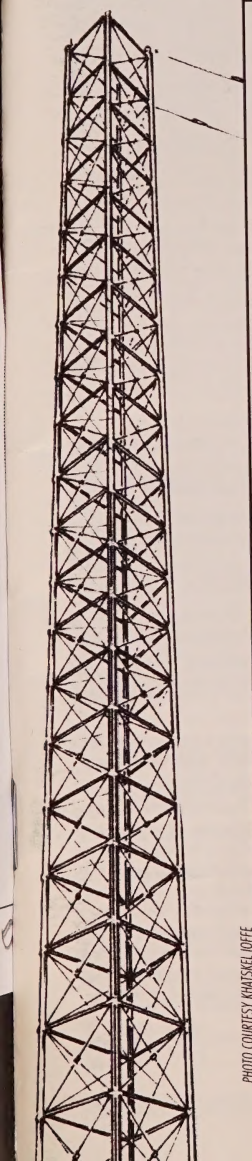

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PHOTO COURTESY KHAISKEL IOFFE

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THE OLD TIMER'S BULLETIN

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The Vacuum Tube
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ANTIQUE WIRELESS ASSOCIATION, INC.
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The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

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THE PRESIDENT'S MESSAGE

We are now well into the year 2000 and the 21st century has begun, but perhaps this might be a good time to reflect on some of the past accomplishments of the Antique Wireless Association.

It all started in the mid 1950s when Bruce Kelley, W2ICE, a radio amateur from the 1930s, and two of his amateur friends recognized that the history of radio communications needed to be preserved before the artifacts were forever lost. The outgrowth of this decision was the AWA, which started as a small museum in Kelley's barn.

In due course, as a result of substantial interest in his efforts both as a museum curator and as a historian, the "club" was opened to local membership and a small mimeographed bulletin, termed *The OTB* (*The Old Timers Bulletin*), was published. *The OTB* is now under the expert editorship of Marc Ellis, and is widely recognized as one of the best publications of its kind.

The organization has continued to grow, and we now number some 4000 members spread across the globe. The museum, now a separate organization for legal reasons, is one of the foremost in the world, with many one-of-a-kind radio/wireless artifacts, and is constantly receiving donations. It is under the very able leadership of long-time member Ed Gable. Its activities continue year round, and include a substantial outreach program. We have been occupying leased space in the historic Academy Building in Bloomfield, NY, for a number of years, and one of our goals is to be able to move into our own museum building.

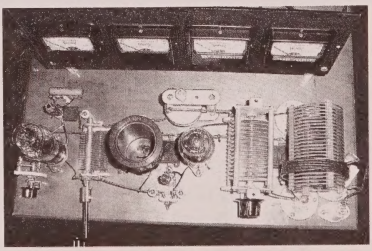
The AWA is run by a board of directors, who meet twice a year and serve at their own expense. Some come from as far away as Chicago, West Virginia, New Jersey, and Washington, DC, spreading out from the original upstate New York group which is still heavily represented. They include professional and industrial people, retirees, and a significant number are radio amateurs. All have a deep interest in the subject matter and in the organization and its survival and growth.

So what have we accomplished lately? At the November board meeting we started to upgrade the By-Laws, and recognized for the first time the formalized AWA Chapters program. We are also on the way to receiving formal recognition from the New York State Board of Regents in the form of a permanent charter for the AWA Museum, which over the years has operated on a provisional charter. But underlying these changes is the fact that the AWA, and its programs and services, such as the Annual Conference of members, are still conducted essentially as organized by the founders years ago.

We have a lot on our plate now, and the board may have to begin meeting three times a year to get through the pile up of business. But one of our goals, even as we grow and progress, is to remain true to the goals set up by Bruce Kelley and friends back in the 1950s. And as members, your continued interest and comments are invited.

BILL COFFEY'S 1929 MOPA

Recently Bill sent us this shot of an OT contest rig he built several years ago. The modern meters are a bit jarring and not all of the other parts are vintage, but the circuit is period, and that's what counts in the contest! The type 45 MO stage is coupled to a PA also using a 45. Output is link coupled to an antenna tuner. Power input is limited to 5 watts to conserve the scarce 45.



The two meters on the left originally indicated grid and plate current for the MO stage, but were later disabled and left in place. The two on the right show grid and plate current for the PA stage.

Bill tells us that he built the rig out of nostalgia for the good old days. He was an active ham 61 years ago and longed for the touch of the old "machinery." Design details came from various *OTB* articles describing other contest rigs.

FROM THE EDITOR

This issue has a decidedly 1920s flavor, and that's appropriate because this is the issue in which we report the results of the Bruce Kelley Memorial 1929 QSO Party. Those who had problems with temperamental Hartleys will want to study "Rotten Signals: How to Cure Them," our reprint of a classic 1933 QST article by George Grammer. It covers just about every area requiring attention if you are to get the most efficiency and the best note out of your vintage 1-tuber.

In addition Bob Gunshor, W2LDM, has contributed "Evolution of a 1922 MOPA Transmitter." In this interesting piece, Bob lets us in on his thinking as he planned and built first a couple of one-tube rigs (a TNT and a Hartley), then progressed to the 45-45 MOPA that is the main subject of the article. You can take a peek at another 45-45 MOPA in a short filler article (previous page) contributed by Bill Coffey.

Finally, Ken Owens ("Grid Leak Detection in 1920s Receivers") jumps into the lively discussion of the infamous grid leak return connection that has been raging in our "Letters to the Editor" column. Speaking of Ken, his regular column "Equipment Restoration" is absent because of lack of reader contributions. The column was set up as a venue in which members could share their restoration problems and triumphs. So if you have something to share, please send Ken some grist for his mill.

In this issue we welcome two new columns to *The OTB*: "Below 535," edited by Frank Lotito, which will deal with the technology for receiving and transmitting below the broadcast band and the SWL opportunities in that area of the spectrum. "Mikes and Men," edited by George Freeman, will be a series of very brief columns, each one showing a different vintage mic in use, describing the circumstances, and giving the technical specs on the unit if known. I won't say any more about these columns here because I've written a detailed "Editor's Introduction" for each—which you'll find at the beginning of the respective columns.

Another new feature which has an appropriate introduction at the column itself and needs few extra words here is AWA President Bill Fizette's outreach series for newcomers: "A Structured Approach to Fixing Up Those Nice Old Radios." This is not a regular column, although it may appear rather regularly at first, and will not necessarily be represented in every issue. Bill will get the ball rolling with this first attempt to help newcomers to the hobby —and he'll continue as long as he feels he has something to say. Member contributions are welcome too—and long-term we're interested in hearing from folks who might be interested in starting a full-fledged column for beginners.

Finally, a word to those who would like to submit photos and graphics to *The OTB* by digital means. Digital cameras are getting more and more common, and I'm beginning to see more and more of their images submitted via disk. I'm not a digital camera expert, but unless yours can provide images of 200-300 dpi resolution we can't use them.

Perhaps a reader can help us out here—but my take on the subject is that the only cameras that might be able to do this are too expensive to be in common use. Your 72 dpi image (the standard for electronic viewing) might look very nice on your monitor screen—but it falls apart on the printed page. The same goes for printouts made from such files.

Even a routine photograph from a conventional camera results in printed images of much better quality than the average digital camera.

For those who have access to a good scanner and would like to send scans rather than original photos, here are the specs: Please scan at 300 dpi and set the image size so that the largest dimension is in the 4" range. Save the image as a BMP or a TIF file, NOT a JPG. Warning: this makes a very big file.

You can save file size by scanning in grayscale rather than color because we do not use color photos in *The OTB*. You should use grayscale even if your material is "line art" (everything all black or all white). Most scanner programs give you a line art option, but a grayscale scan gives us many more options for tweaking and improving the image—even if the scan doesn't look good on your screen.

Chances are, your file is going to be too big to submit on a floppy disk. You can compress it quite a bit with a zip program such as PKZip—and we can unzip it on arrival. However, you probably still won't be able to squeeze it onto a floppy. Your options: (1) send it on a Zip disk (if you have a Zip drive). Zip disks are expensive and we will return them, of course. Or (2) send the file to me as an attached e-mail file. It may take several minutes, but the method is quite reliable.

AWA NEWS

***OTB* POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

FEBRUARY 4-6
HVRA/AWA Convention

MARCH 23-25
Spring Meet in the Carolinas

APRIL 12-13
Linc Cundall Memorial OT DX Contest

MAY 6
Semi-Annual Board Meeting

MAY 6
Bloomfield, NY Spring Meet

RADIO DAZE 2000
May 19-20

SEPTEMBER 6-9
AWA Annual Conference

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

HVRA/AWA CONVENTION

February 4-6

At the Hobby Airport Hilton (directly across the street from the airport—EZ Van shuttle). Rooms $69, single or double. Two auctions (Friday night and Saturday), technical talks, flea market, old equipment contest (featuring Sears Silvertone), awards banquet. More info: write HVRA, P.O. Box 31276, Houston, TX 77231-1276

RADIO XXX

February 20

Sponsored by The Greater Boston Antique Radio Collectors; organized by *Antique Radio Classified* magazine. 8:00 a.m. to 1:00 p.m. at Westford Regency Inn, Westford, MA. From I-495 take exit 32; follow "To Rt. 225" sign. At stop light, turn rt. onto Rt. 110 West for 0.4 miles; Wesford Regency is on your right. For room registration phone 1-800-543-7801, mention Radio XXX. Fees: $6.00 admission (spouse & children free) plus $18.00 per 8' table. 6500 square feet, 90+ tables available. Informal dinner previous evening 7 p.m. to 9 p.m. (Dutch, no reservations necessary) at Yangtze River Chinese Restaurant, 2.2 mi. west of Westford Regency on Rt. 110. Register at the door or preregister: with credit card, call 978-371-0512 or fax 978-371-7129; by check or MO (made out to A.R,C.), send to Radio XXX, c/o A.R.C., P.O. Box 2, Carlisle, MA. 01741.

SPRING MEET IN THE CAROLINAS

March 23-25

Presented by AWA Carolinas Chapter. See the boxed "With The Chapters" item elesewhere in this Department.

BLOOMFIELD, NY SPRING MEET

May 6

There'll be plenty of great finds to be made at our low-key, but always rewarding spring meet.

8:00 a.m.—Flea market officially starts. Parking spots are $2.00 (set up 6 a.m.). No attendance charge.

9:00 a.m.—Sale of excess items from the museum annex.

Noon—Famous sit-down luncheon served by the American Legion Ladies. Tickets available on site Saturday morning.

1:00 p.m.—Members' auction (no fee) and auction of goodies from the Annex.

2:00 p.m.—Museum open to visitors.

Location: AWA annex building, 6910 Rt. 5 & 20 (near intersection with Rt. 444), Bloomfield, NY—on the grounds of the American Legion post. For further info, contact Ed Gable at (716) 392-3088 or k2mp@eznet.net

2ND ANNUAL KUTZTOWN MEET

May 13

At the Renningers Antique and Farmers Market, Kutztown, PA. 75+ spaces under roof plus unlimited spaces outdoors. We are going to try to include an auction this year. Camping available on site and motels nearby. For more info: Dan

DeWald (610) 683-6848; Steve Wallace: (610) 944-7230, kks@epix.net.

RADIO DAZE 2000

May 19-20

Presented by the Northland Antique Radio Club and the Pavek Museum at Comfort Inn, Hwy 55 and Interstate 494, Plymouth, MN 55447, (612) 559-1222. Swap meet dawn til dusk Friday, dawn till noon Saturday. Auction Friday evening, contest, luncheon and program on Saturday. Radio raffle, Hospitality room open 7 a.m. both days. For additional info, contact NARC at PO Box 18362, Minneapolis, MN 55418 or visit the NARC web site at http://www.geocities.com/TelevisionCity/4544

Recurring Meetings

• **California Historical Radio Society** — For info on current meetings, call the CHRS hotline: (415) 821-9800.

• **CARS, the Cincinnati Antique Radio Society** — Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cinti.) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

• **Carolinas Chapter of the AWA** — Meets approximately bimonthly. For more information, Contact Ron Lawrence, President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166.

• **Central Ohio Antique Radio Assn.** — Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (I-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

• **Delaware Valley Historic Radio Club** — Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Teford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a subscription to the club's monthly newsletter "The Oscillator." For more info contact Bill Overbeck at (610) 789-8199 or Dave Snellman at (215) 345-4248. Club mailing address: P.O. Box 847, Havertown, PA 19053.

• **Houston Vintage Radio Association** — Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

• **Hudson Valley Antique Radio & Phono Society** — Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

• **London Vintage Radio Club** — This Ontario, Canada club meets in London on the last Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada. (519) 638-2827.

• **Mid-Atlantic Radio Club** — Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Ed Lyon, 11301 Woodland Way, Myersville, MD 21773-9133, (301) 293-1773, e-mail lyon@fred.net or Membership Chair, Barry Zimmerman, (301) 696-5561, e-mail: barryradio@aol.com.

• **New Jersey Antique Radio Club** — Meets second Friday each month, 7:30 p.m. Holds three

• **Tube Collector's Group Formed** — The new Tube Collector's Association is now in operation. This is an organization of collectors and history enthusiasts focusing on all phases and vintages of tube design. The founding president of the group is Al Jones, W1ITX, who is known for his award-winning tube collection. For more details and complimentary copies of the association's bulletin, contact Al at (707) 464-6470, Ludwell Sibley at (541) 855-5207, or mail to P.O. Box 1181, Medford, OR.

Call For Papers

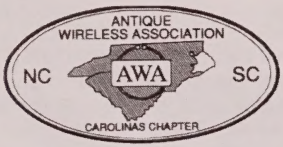
AWA REVIEW FOR YEAR 2000

At present, we do not have enough material to put out a year 2000 AWA Review (Volume 13). If anyone has a paper that is of Review status, meeting the general format for historical content and at least 20 pages long, please get in touch with *Review* Editor Bill Fizette immediately, (Tel. 570-629-0637; e-mail w2dgb@enter.net). The deadline for receiving materials is April 1, which will leave enough time for queries and editing. The books must be printed, boxed, shipped and ready for sale on September 1.

With the Chapters

At the November, 1999 AWA Board meeting the By-Laws were amended and for the first time recognized formally the existence of AWA Chapters. This is another form of our outreach program, and will include groups that have been and will be associating themselves with the parent organization, as well as some groups that were inherited from ARCA when it was merged with the AWA. Those independent organizations who have an interest in such an association are invited to contact Vice President Ron Frisbie. from now on Chapter news will be reported here in each issue of The OTB.

—Bill Fizette, President, AWA



The Carolinas Chapter of the AWA Inc.(CC-AWA) was formed in 1995 by a group of collectors that live in and around Charlotte North Carolina. Members of this group had been hosting AWA Southeast Conference meets since 1979, when we took over for Lew Ellis, W4DBT, who had been holding them since 1976. It is interesting to note that Lew was the designer of the AWA logo and since he started all this we consider him to be the father of the CC-AWA. We have also named our "Best of Show" award "The Lew Ellis Award."

The CC-AWA newsletter *Radio Daze* is published bi-monthly. Laura Carter is our very capable and hardworking editor.The CC-AWA has just started a new long term project that we hope will lead to the establishment of our own museum sometime in the hopefully not-too-distant future.

The current CC-AWA officers are:
President - Ron Lawrence, KC4YOY
Vice President - John Stegal
Treasurer - Robert Lozier, KD4HSH

The CC-AWA hosts four "mini meets" each year in North and South Carolina. These one-day (Saturday only) meets are held in January, May, July, and October. Admission is always free. A seller's fee is charged only in July, since we have to pay for the use of the facility at the North Carolina State Fairgrounds in Raleigh.

The July, 2000 meet will be all indoors and Air-conditioned. The May meet is held at the North Carolina Transportation Museum, "Spencer Shops," in Spencer NC. This is a former Steam Locomotive repair facility that is now a first class museum. A great meet with something for the entire family. Plan to spend the whole day!

The meets held in October and January are both in city parks. In October it is the City Lake Park in Jamestown NC just outside Greensboro. This event is under the direction of Brad Jones. The January 2000 meet will be the first chapter event in South Carolina and will be in Columbia. This meet is headed up by Carl Shirley and Gerald Cromer.

The CC-AWA "main event" is our Spring Meet in the Carolinas, and is coming up soon (March 23, 24 & 25). It will be held in Charlotte NC at the Sheraton Airport Plaza Hotel. This is a full-blown conference with program sessions on Thursday afternoon and evening. The Flea Market starts on Friday morning with our "Lemans Start" at 8am. We have an Equipment Auction on Friday afternoon and a Reception on Friday evening to view the many entries in the Old Equipment Contest. The conference wraps up on Saturday with more Flea Market in the morning followed by the annual member luncheon at noon.

For registration information please send a SASE to, P.O. Box 3015, Matthews, NC 28106, or visit our web page at CC-AWA.org where you will find a printable pre-registration form. Flea Market space is limited so you're encouraged to pre-register and save yourself some money.

Congratulations to AWA Board member John Dilks, K2TQN on his new column, "Old Radio," which made its debut in the December QST. We predict that it will create a considerable interest in the old artifacts and radio history, with one result that the prices of the "boatanchors" amateur gear will rise still higher!—*wbf*

annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

• **Northwest Vintage Radio Society** — Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abernathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

• **Oklahoma Vintage Radio Collectors** — Meets second Saturday each month, Oklahoma Station Bar-B-Q, 4333 NW 50th St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625, or call (405) 755-4139 or (405) 732-6070.

• **Ottawa Vintage Radio Club** — Meets monthly (except June and July) in Conference Room, Ottawa Citizen, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

• **Society for Preservation of Antique Radio Knowledge** — Meets at 7:30 p.m., fourth Tuesday of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $12/year. Write SPARK P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call Dan Gebhart (937) 299-9570.

• **Texas Antique Radio Club** — New club forming in San Antonio area. Meeting dates to be announced. Contact: Joe Koester, President TARC, 7111 Misty Brook, San Antonio, TX 78250-3498. (210) 522-1662.

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, P.O. Box 41, Sodus, NY 14551. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-

(continued on page 12)

AWA NETS

PHONE:

SUNDAY:
7247 kHz, SSB, noon (NCS:WA4IAM); 3837 kHz, AM 4 p.m. (E.S.T.), 4:30 p.m. (during E.D.S.T.) (NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz SSB, 2:30 p.m. (NCSs KC3YE and W0FXY) 3837 kHz SSB, 8 p.m. (NCS N4FS)

MONDAY-WEDNESDAY-FRIDAY:
3867 kHz, 9:30 a.m. (NCS: W2SHN)

CW:

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up. First **WEDNESDAY** of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 146.820 MHz;
Transmit 146.220 MHZ

BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239

PLEASE INCLUDE SASE FOR REPLY.

The Long and Short of It

This new OTB *column came about as a result of a conversation I had with Frank Lotito at the conference last September. He had asked me if there was some way I could help him find AWA support for the ARRL's efforts in obtaining an amateur radio frequency assignment in the longwave (below the broadcast band) range. Being an editor and not a politician, my response was to ask Frank to start a new column in* The OTB *devoted to longwave history and technology.*

Over a period of time, this might make members more and more aware of some of the possibilities and the excitement of working at VLF (very low frequencies). After all, these are the frequencies where radio—including amateur radio—had its start. These are also the frequencies where vintage circuits and much of the boat-anchor gear work very nicely.

Frank was excited about the idea, and has agreed to start a VLF column on a tentative basis. He will write some trial columns to kick things off, but won't make a long-term commitment until he is sure there is solid reader support. He wants constructive feedback from our readers as well as articles and other contributions from those with special expertise. So if you like what you see, don't hesitate to contact Frank with encouragement and/or help.

Frank writes me that "in draft stage for this column are topics such as antennas, propagation, transmitter types, and receiver types. Depending upon the topic, there will be a mix of historic information and present technology. The present technology will help describe the topic, or put it in present day perspective." Frank is a long-time contributor to The OTB, *and you'll find his bio in the "About Our Authors" section of the previous issue—which carries his article on an early 1920s one-tube transmitter.*

—MFE

What's the use of anything going on below 535 kHz? "Listen some day," the doubters will say, "and you'll hear only intermittent buzzing sounds, beeps, on/off hash, repeated nonsense in slow code, and on rare occasions, voice messages. Besides, it is common knowledge that you can't get beyond the front gate at those frequencies."

A pre-WW1 government legislator, military communications officer, or amateur radio operator would have laughed at that untruth! Back in the early teens the radio amateurs were actually kicked off the "useful" wavelenghts of some 1000+ meters, and banished to the "useless" wavelenghts of 200 meters and less! (Except for special traffic stations at 425 kHz[1].) Try telling that untruth to our present day cousins in the UK, Continental Europe, Australia, and New Zealand, where amateurs recently got the green light[2] to participate at wavelengths representative of the birth of radio communications!

Many of the terms frequently used in the popular press and academic radio literature reflect the early technology. "Short wave," for example. During this century's first 2 decades, everyday radio communications took place on wavelengths of 10,000 to 1,000 meters (30 kHz to 300 kHz). Definitely, 200 meters was "short wave!"[3] In the early 1940s, frequencies above 28,000 kHz were still considered UHF[4], but near the close of World War 2, the references to UHF[5] are more apt to be in the 300-3000 MHz range! Microwaves were still being referred to as "millimeter waves" in the early 1960s[6].

Many present day amateurs with a General Class or higher license "wring their hands and come up with a multitude of excuses" for why they are not participating on 160, or even 80 meters. According to pre-WW1 standards, 160 meters is "short wave!" So, modern computer-jet age man, what's your excuse? (We will introduce the topic of LF antennas in a future edition of *The OTB*.)

By the mid-1930s "frequency" replaced the term "wavelength" when describing where in the radio spectrum a radio receiver or transmitter was tuned. To boot, inductance in Henrys and capacitance in Farads had firmly replaced length (centimeters) as the unit of measure of inductance and capacitance. Confusing? Not if you

Frequency Assignments Below 535 kHz In the 1920s, 1930s and 1960s

FROM MORECROFT[10] 1921 AND 1927

FREQUENCY IN KHZ	ASSIGNMENT
15-30	trans-oceanic
30-300	300-1000 mile distances
300-660	50-300 mile distances
660 and up	short distances

FROM MORECROFT[10] 1933

FREQUENCY IN KHZ	ASSIGNMENT
10-100	fixed point-to-point, trans-oceanic, government and commercial
100-195	fixed point-to-point and ship-to-shore
195-245	government
245-283	point-to-point and government
283-390	government
390-485	maritime mobile, aircraft, government
485-500	government
500	S.O.S.
500-550	government
550	start of the AM broadcast band

FROM REFERENCE DATA FOR RADIO ENGINEERS, 4TH ED, 7TH PRINTING, 1961[11]

FREQUENCY IN KHZ	ASSIGNMENT	COMMENTS
below 9	unregulated	
10-14	radio navigation	Omega, now inactive
14-90	fixed, maritime mobile	Current UK/European ham band @ 73 kHz
90-110	radio navigation	Loran C (to be deactivated)
110-160	fixed, maritime mobile	Current UK/European ham band @ 132 kHz
160-200	fixed	US/Canada Experimenter's band @ 160-190 kHz
200-285	aeronautical mobile and aeronautical navigation	
285-325	maritime radio beacons	
325-405	aeronautical mobile and aeronautical navigation	
405-415	aeronautical mobile and aeronautical navigation, maritime radio beacons	
415-490	maritime mobile	
490-510	*international distress frequency*	
510-535	mobile	
535	start of AM Broadcast Band	

understand a little basic theory. We'll save that for a future discussion along with "decrement."

So what's happening down there in the land below 535 kHz? The three tables accompanying this article show a late '20s, early '30s and early '60s representation of the radio spectrum. Just for reference, I've included in to the 60s table the present-day amateur assignments for UK/Europe (73 kHz and 132 kHz), and the present day US and Canadian "experimenter's no-license band" (160-190 kHz).

The big question is "How far can an amateur launch his signal at these frequencies?" In the pre-1920s, with a one kilowatt home made spark transmitter and one tube Audion receiver the answer would have been "Usually no further than across town; sometimes 500 miles or more." The 500+ miles estimate would have to assume (1) that you had minimal interference from other spark transmitters 100 kHz to either side of your receiving frequency, and (2) that you had a "state of the art" loose coupler for your receiving set! Today, with half kilowatt of RF into a very restricted antenna structure, UK amateur have reported 700+ miles[7] on 132 kHz, 80+ miles on 73 kHz, and 100 miles[8] semi-mobile, more like portable, on 132 kHz, all using conventional CW! The US "experimenter" operating under Part 15 rules can get 20 to 300+ miles.

So much for our quick introduction to the radio spectrum below 535 kHz. In the meantime, assuming you have a computer and access to the

Web, check out the URLs in the list of references, including what the Long Wave Club of America is doing[9]. WOW!

REFERENCES:

1. *200 Meters and Down*, Clinton B. DeSoto, American Radio Relay League, 1936, page 47.
2. *The LF Experimenter's Source Book*, (2nd Edition), 1998, Radio Society of Great Britain, pages 1.1 and 1.20.
3. *The Radio Amateur's Handbook*, (3rd Edition), first printing, 1927, American Radio Relay League, Inc., page 2.
4. *The Radio Amateur's Handbook*, (19th Edition), second printing, 1942, American Radio Relay League, Inc., page 285.
5. *The Radio Amateur's Handbook*, (22nd Edition), second printing, 1945, American Radio Relay League, Inc., page 33.
6. *Magnetrons*, K. Hinkel, John F. Rider, Inc., 1st Edition, 1961. 7. www.dennison.demon.co.uk/lf.htm (G3XDV)
8. www.picks.force9.co.uk/shack.htm (G3YXM)
9. http://www.lwca.org/ (Long Wave Club of America)
10. *Principles of Radio Communications*, J. H. Morecroft, John Wiley & Sons, 1st, 2nd, and 3rd Editions
11. See 47 CFR 2.106 for complete up to date details, or the URL www.access.gpo.gov/nara/cfr/index.html for the US Government Printing Office.

Note, references 1-6 do not attempt to imply the "first time" a particular term was used in print. The references just give examples of the period's common usage of certain terms.

***AWA NEWS,** continued from page 9*

automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

SILENT KEYS

We record the passing of the following AWA members with deep regret.

ERNIE DECOSTE (5-29-99)
Curator of Communications, Museum of Science and Technology, Ottawa, Canada (1968-1996).

FREDERICK OLIVER HAMMOND, VE3HC (11-7-99)
Founder of Hammond Manufacturing Co. and the Hammond Museum of Radio. First licensed, 1929. Inducted into the Canadian Amateur Hall of Fame, 1996. A long-time friend and supporter of The AWA.

Note: AWA officers and members are requested to submit all information about Silent Keys, with or without special recognition, to Joyce Peckham, Secretary, Box E, Bresport, NY 14816. This will help in the collection, coordination and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12—"The Key." (See description for V-6.)

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

RESPONSE TO CONFERENCE CRITICISM

Readers will remember the letter from Richard Desjarlais (Littleton, MA), printed here in the last issue, objecting to the fact that flea market attendees at our annual conference are required to be AWA members and to purchase a conference registration.

Richard also sent copies to several board members, including Larry Babcock. Larry sent me this copy of his well reasoned response in which, he makes clear, he is speaking personally and not as an AWA representative. However, the matter was indeed discussed at last November's board meeting, and it was decided that we will continue to enforce our long standing policies regarding flea market attendance.

Regrettably Larry's letter didn't quite arrive in time to print along with Richard's.—MFE

Dear Mr. Desjarlais.

Thank you for sending me a copy of your letter to Marc Ellis dated 9/22/99. The board is always interested in the feelings of AWA members and appreciates your taking the time to tell your ideas and problems. I am sure that the board will want to discuss your feelings at a future board meeting.

Please understand that the following comments are my personal response to your letter and I am not writing this to represent the AWA. I am very sorry to hear that your sales at the Sept. 1999 AWA meet in Rochester were poorer than in other years. I hope they will improve at future AWA meets. I make it a point to spend much of my time at these meets in the flea market area talking with sellers and I must tell you that most reported good to excellent sales and they were happy with the results. Obviously this was not the case for you and I am truly sorry.

First I want you to know that there was no change made to the policy of admission to the flea market this year. This is and always has been a private meeting for AWA members only. The only difference is that this year the AWA decided it was time to enforce the policy because there are so many gate crashers sneaking in without registering.

You stated that these non-members were shocked to find this year that they had to pay to enter. Perhaps, but I am sure they always knew that they ware supposed to be registered AWA members to attend the event. This year the off-duty police guards made sure everyone followed the rules. It was costly to hire the guards but necessary to prevent dishonest buyers from sneaking in. The honor system was not working. Incidentally, there were about 250 additional registered members attending the event this year and the total attendance was well over 1,100 members.

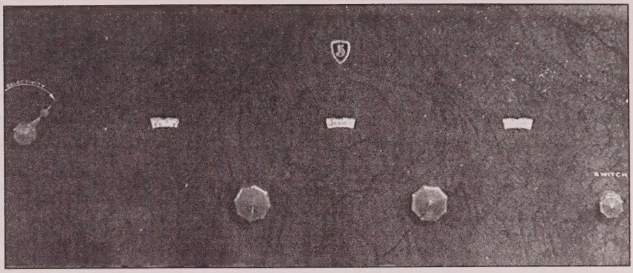
The AWA has expenses. It is costly to run this meet and a modest profit is required to support the AWA museum. Why shouldn't every participant be required to share in the cost? As you mentioned in your letter a permit is required to hold this event and it must be a private club activity to be permitted. Also, as you mentioned, there is the matter of sales tax which I understand would have to be collected in both the flea market and the auction if the meet were opened to the public.

I attend eight or ten radio meets yearly and I have noticed that many were smaller this year. Most collectors attribute this to competition from the internet. Perhaps this may have contributed to your reduced sales. Do you sell your better stuff on the internet or did you bring it all with you to the AWA meet? I did not notice a drop in the size of the AWA meet this year. Certainly the auction was as large as in previous years.

Now that gate crashers know they must join the club and register for the conference to enter the flea market they can save a few bucks by pre-registration. As members they will receive information on how to do this. Also they will receive a subscription to this quarterly magazine and they will be able to place free classifieds in it. A pretty good deal for $15.00.

LARRY BABCOCK
East Amherst, NY

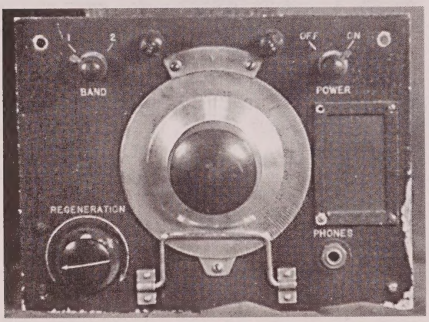
THREE MYSTERY SETS

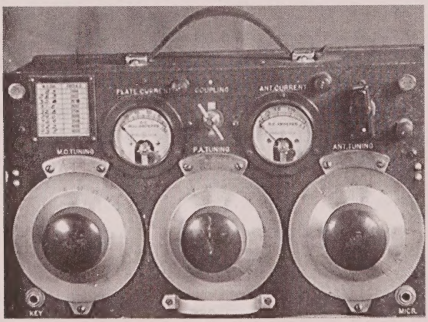


Manufacturer of "mystery" 3-dialer is identified only by a monogram "S" on the panel.

I'm enclosing pictures of some interesting old sets I recently picked up and could use some help in identifying! The "3-dialer" receiver has no identity other than a monogram "S" on the panel and a serial number. It has four sockets for Kellogg tubes and one (output stage) for an 01-A. The other two units are a companion receiver and transmitter. These are commercially made, not home brew. Nameplates have been removed, but the inside of the receiver panel has a U.S. Coast Guard symbol, as does the base of one of the tubes.

The receiver is a two-band regenerative using two type 32s and a type 30. Its panel is about 8" square. The transmitter, of similar construction, is a MOPA using a type 112 oscillator and three 301As in the audio and tank circuits—though I don't know if the tubes are in the right sockets. The meters measure antenna and plate current.





Regenerative receiver (top) and matching transmitter were apparently once Coast Guard rigs.

The jacks are for mike and key. According to the front-panel chart, the rig tunes between 2464 and 4050 kHz. There is no power supply; I believe these were battery units.

Can anyone identify these sets and possible supply schematics?

ALTON A. DUBOIS, JR.
67 Peggy Ann Rd.
Queensbury, NY 12804

AUTO RADIO MEMORIES

My interest in radio began in early 1937 with parts from the 1920s. The article "Six-Volt Tubes and Auto Radios" in the November Equipment Restoration column provoked some memories.

One day walking along the street in Astoria, LI, NY, where I then lived, I noticed an odd shape in a trash can. It turned out to be a Motorola Auto radio main chassis with a complete set of tubes—6A7,77,78,85,41 and I think a 1V or 84 rectifier. This was my first introduction to the 6-volt series of tubes. The other parts were so specialized that at the time I didn't know what they were.

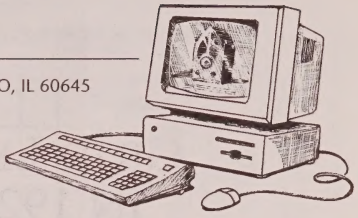
A few years later, I was employed in the radio repair business. As World War II went on, civilian radio production ceased. However there apparently were quite a number of auto radios on dealer's shelves, and no new cars to put them into. So a good many were put into blank console radio cabinets, with the then customary remote head being mounted in front. And yes, they were superb radios.

I no longer recall how the necessary 6-volt DC was obtained; some no doubt used batteries & trickle chargers, and others must have had the power supply modified for 115-volt AC lines.

JUSTIN J. MUELLER
Manchester, VT

ON THE INTERNET

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



History and Ham Equipment

In the last column, I offered a list of a few of the more prominent museums and collections on the Internet. During the two long holiday weekends, I got a change to surf around the Net and thought this time I would offer an eclectic mix of various radio/history/Ham/equipment websites. Some deal with collecting, broadcasting, early electromagnetic research and two deal with world famous equipment: Vibroplex keys and Hallicrafters radios.

http://www.exit109.com/~jimh/wlw.shtml
Jim Hawkins' WLW Transmitter Page. WLW, Cincinnati, Ohio, was the first United States commercial 50 kW station by Powel Crosley.

http://www.neuronet.pitt.edu/~bogdan/tesla/
Nicola Tesla Page. History, a short biography, archives, links and much more.

http://members.aol.com/oldradjo/gallery.html
Scott Balderston's Vintage Headphone Museum Gallery. Over one hundred pictures of headphones from the teens and 20s.

http://www.la.ca.us/frandy/index.html
The Vibroplex Collector's Page by Randy Cole, KN6W. Identifying and dating bugs as well as history and information sources.

Chuck Dachis' Home Page

A selection from Scott Balderston's Vintage Headphone Museum Gallery

http://www.vibroplex.com
The Vibroplex Homepage "Since 1890—the oldest name in amateur radio." Has pictures, drawings and adjustments of some models.

http://www.hallicraftercollector.com/
"The Hallicrafter Collector" website by Chuck Dachis, author of *Radios by Hallicrafters*. Click on his link to the Hallicrafters Collectors Association. Many excellent photos of just about every model I've heard of.

http://home.wxs.nl/~meuls003/home.html
In Louis Meulstee's web site you will find basic technical descriptions and photographs of many vintage radio sets once used by the British Army.

http://www.geocities.com/~ck722transistor index. html
Historical Page of the CK722 Germanium Transistor. This page give much technical and historical data on one of the early solid-state devices spelling the eventual commercial demise of the vacuum tube.

http://members.accessus.net/~dwentz/kb9jja/heathkit/
Heathkit Ham Radio Pages of KB9JJA. A wealth of tips, technical info, manuals and two message forums for the ubiquitous Heathkit line.

BY D.K. OWENS

GRID LEAK DETECTION IN 1920S RECEIVERS

Although I specialize in radios of the 1920s, I never gave grid leak detectors much thought. Every radio of the period has one, so you don't notice them. Then Dick Parks' *Breadboarding* article (*OTB*, V. 40, No. 2) started a fascinating discussion which seems to center around why the grid leak is returned to the A+ (or in some radios) the A- filament lead. Some ingenious explanations have been offered by Chappell and Merz (*OTB*, V. 40, No. 3 and by Grady (*OTB*, V. 40, No. 4) in *Letters to the Editor,* but none entirely satisfied me. I decided to look into the matter.

Background

The first RCA tubes sold to the public were the Types UV200 and UV201. Throughout the 1920s, each came with a data sheet giving the characteristics, recommended operating voltages and typical circuits. The circuits showed the grid leak returned to A+ for the Type 201 and to A- for the Type 200. The last is a special tube intended for grid leak detector service only. It was very popular in the early years because it was much more sensitive than the Type 201.

Terman (Ref. 1) describes grid leak (or grid current) detectors, but he hides his explanations in such a dense thicket of mathematics that it's hard to get a clear picture of the process. If you want to read further, I recommend Henney (Ref. 2). He can always be relied upon to give a lucid explanation without overwhelming math.

First, we need to remind ourselves that the world of the vacuum tube lies entirely within its glass envelope. The tube neither knows nor cares what happens outside. All it sees is the voltages on its elements with respect to its cathode. The tube always regards its cathode as the zero voltage point. If you apply 1000V to the plate, 900V to the cathode, and 895V to the grid, the tube sees 0V on the cathode, +100V on the plate and -5V on the grid.

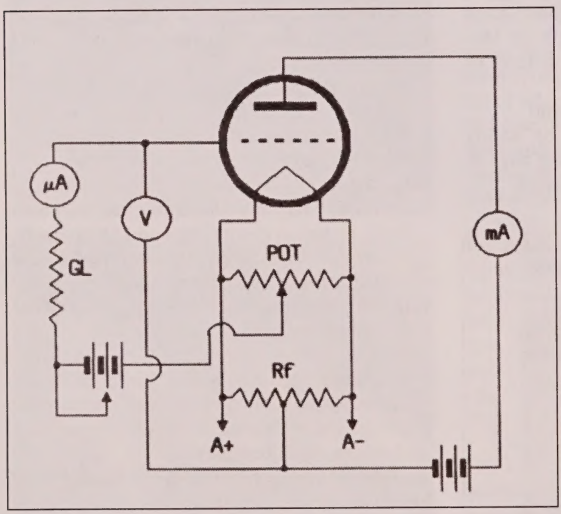


Fig. 1

This is fine if the tube has a true cathode. Where is the cathode when the emitter is a filament with a potential gradient along its length? This may seem complicated to us, but not to the tube. The cathode is the midpoint of the filament. You can test this by setting up a tube with known plate and grid voltages and measuring the plate current with the B- connected to a center-tapped resistor across the filament leads. If you move the B- to the A+ lead, the plate current

AUTHOR'S ADDRESS: 478 SYCAMORE DRIVE, CIRCLEVILLE, OH 43113

will increase.

Reduce the B+ voltage to get the same plate current as before, and you will find that the reduction is exactly half the filament voltage. Move the B- lead to the A- and the plate current will decrease. You must increase the B+ voltage by half the filament voltage to restore the plate current.

In both cases we simply put half the filament voltage in series with the B+. In one case we buck the B+ and aid it in the other. Clearly, the tube is averaging the filament voltage along its length to get zero — the filament center. Most manufacturers connected B- to A+ so they could return the RF amplifier grids to A- and get -2.5V grid bias for free.

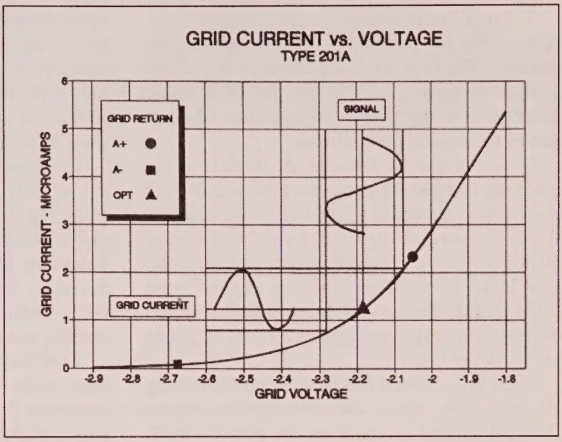


Fig. 2

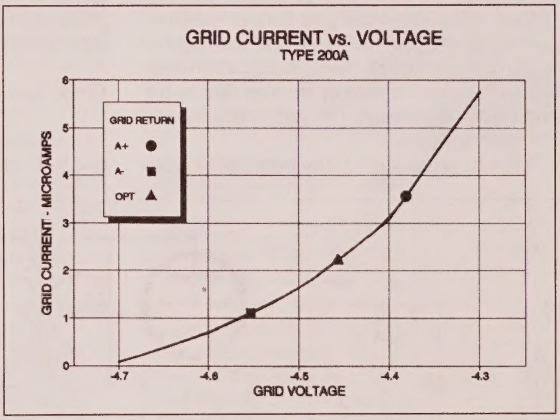


Fig. 3

Grid Leak Operation— Type 201A

I assembled the test circuit of Fig. 1. Initially the 500Ω potentiometer was set to the center. Grid voltage was measured to filament center with an FET meter having an input resistance of 100MΩ. Grid current was calculated from the voltage drop across the grid leak, GL, using the same meter. GL was 2.2MΩ. The actual value was 2.0MΩ with the 100MΩ meter resistance in parallel. Rf was a 40Ω center-tapped resistor. Plate current was also measured with 22.5V applied. The voltage sources shown as batteries were actually regulated supplies. By reversing polarity, the grid leak return could be made increasingly positive or negative.

When the filament is heated, the grid becomes negative with respect to the cathode even without plate voltage because electrons strike the grid and give it a negative charge. These electrons must go somewhere, so they flow back to the filament through the grid leak creating a current.

Since the high resistance of GL impedes the current flow, a negative potential builds up on the grid. The tube reaches equilibrium where the number of electrons landing on the grid equals the number flowing away through GL. If plate voltage is applied, grid current decreases simply because many electrons which formerly would have struck the grid are now attracted to the plate.

If we apply voltage or bias to the bottom of the grid leak, we can vary the grid voltage and thereby the current. For the type 201A the relationship of Fig.2 can be established. The grid acts like a diode. If the bottom of the grid leak is positive, current increases analogous to forward bias on a diode. If it is made negative, current de-

creases as with reverse diode bias.

The non-linear voltage-current relationship is responsible for detection. The grid never goes positive. The bias alters the conductivity of the grid-diode (griode?). This bias has a different purpose from the bias in an amplifier where it serves to regulate plate current.

If we remove the bias on the bottom of the grid leak and just rotate the pot between A+ and A-, we can determine the voltages and currents for these settings. Atwater Kent used a point 60% from the A+ and 40% from the A- for the grid leak return. Let's call this the optimum (OPT) point. We can set the pot to this value and determine voltage and current. These 3 points are marked in Fig. 2.

If the grid voltage is varied by an alternating RF signal, the non-linear characteristic causes the grid current increase on the positive half-cycle to be greater than the grid current decrease on the negative half-cycle as shown. The DC voltage drop across the grid leak is therefore greater on the positive half-cycle than on the negative. By definition, this is rectification or detection. The net increase of electron flow to the grid causes the average DC grid voltage to become more negative.

An AM radio signal has both half-cycles equally modulated, but in opposite polarity so the modulation cancels and we can't hear anything. In the grid leak detector, the DC grid current fluctuates in accordance with the modulation envelope. Since the positive fluctuations are greater than the negative, they do not completely cancel. Therefore the amount of detected signal will be the net difference between the two.

This action occurs entirely on the grid; the plate has nothing to do with it. Once the RF has been demodulated on the grid to a fluctuating DC voltage, the fluctuations will modulate the electron stream flowing to the plate in the manner of an ordinary amplifier. Detection and amplification are separate and independent functions in the same tube.

The reason for returning the grid leak to the A+ or OPT point becomes obvious when we study Fig. 2. If the grid leak is returned to A-, the grid circuit becomes almost non-conducting. Therefore little DC voltage change can be induced by the signal. When returned to A+ or OPT, sufficient current flows to develop a healthy voltage.

If we scale the grid current at the A+ point instead of the OPT point as shown, the difference in current flow on positive vs. negative half-cycles is slightly less. This means that the detected signal should be less when the grid leak is returned to A+ than to OPT. If the leak of a type 201A tube is returned to A-, there should be very little signal developed.

Grid Leak Operation — Type 200A

Whenever you encounter a radio with the grid leak returned to A-, it was designed for a type 200A detector. You cannot use a Type 201A as we will later see. The 200A contains a trace of deliberately introduced gas. It originated from the observation that early Audions made better detectors when they were gassy.

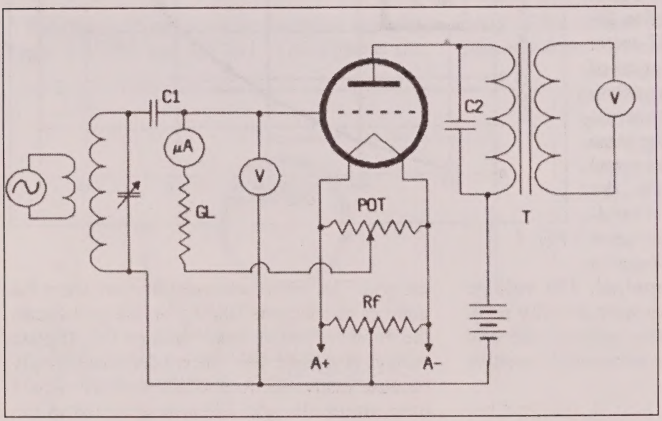


Fig. 4

The gas forms positive ions when bombarded by electrons. The ions are attracted to the negative grid where they are neutralized by taking up an electron. This extra electron flow creates a larger grid current and a more negative grid voltage than in a high-vacuum tube. If we test a Type 200A in the circuit of Fig. 1, we get the relationship shown in Fig. 3.

The first thing we see is that the curve does not "bottom out" like the Type 201A. Second, if we scale the curve for a signal as we did for the 201A, the performance doesn't change much when the grid leak return is varied from A+ to A.

Last, we note that the change of grid current per volt of grid potential change (dIg/dVg) is much larger for the Type 200A. In the vicinity of the OPT point, dIg/dVg = 8.6μA/V for the 201A and 20.5μA/V for the 200A.

This difference should translate into a much larger amount of useful signal with a Type 200A detector. Let's find out if it does.

Detector Performance

I converted the circuit of Fig. 1 to the grid leak detector of Fig. 4 by adding a coil and tuning capacitor from an Atwater Kent radio and a 3:1 audio transformer in the plate supply lead. A 600 kHz, 30% modulated signal was applied to the coil primary and adjusted to give 200mV P-P (70mV RMS) at the grid when at resonance. C1 = 280pF and is part of the coil assembly. C2 is the usual .001μF "phone condenser", and GL is 2.2 MΩ. The audio output was measured at the secondary of the transformer with an AC VTVM. Grid current and voltage were monitored as before. The potentiometer was set at A+ and the audio measured. It was then rotated to the point of maximum output (OPT) and a reading taken. The final reading was made at A-. Plate voltage was 22.5. The results are shown in Table 1.

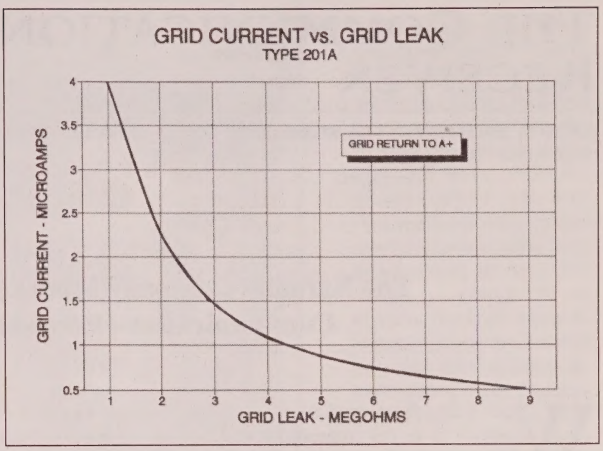


Fig. 5

TABLE 1
DETECTOR TUBE PERFORMANCE

Return	201A Output	200A Output
A+	0.48V	2.00V
OPT	0.58	2.20
A-	0.16	2.20

The resistance of the pot measured at the maximum output point was found to be 60/40 just as AK used, however, the difference in output between OPT and A+ is less than 2 db - hardly audible. As predicted, output is low when the grid leak is returned to A- for the Type 201A. The meter doesn't show it, but if you listen to the signal, it is quite distorted on A-. Also as predicted, it doesn't make much difference where the grid leak goes with the Type 200A.

The large difference in output (~12 db) between Types 201A and 200A is due partly to the greater amount of demodulated signal produced in the grid circuit and partly to the difference in amplification factor, μ, when functioning as audio amplifiers. The measured μ of the Type 201A at the plate and grid voltages used in this test was 7.1. It was 14.8 for the Type 200A.

Effect of Grid Leak Value

Radio enthusiasts fussed a lot with their grid leaks in the 1920s. They were usually held in clips and easy to change. You could buy a variety of values at Woolworth's. Adjustable grid leaks were also available. I examined the effect of grid leak value with the circuit of Fig. 1. The fixed GL was replaced with a calibrated 10MΩ potentiometer returned directly to A+; no bias was used. The results are graphed in Fig. 5 for Type 201A.

The only effect of grid leak value is to vary the grid current and thereby the operating point. In a set where the grid leak was returned to A+, a larger value could shift the operating point to the optimum. Too large a value would have the effect of connecting it to A-. Since we have seen that the difference between A+ and OPT is hardly audible, any improvement in performance by changing grid leaks must have been largely imaginary.

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2. K. Henney, *Principles of Radio*, Fourth Ed., 1942, John Wiley, New York.

THE COMMUNICATIONS RECEIVER

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PLEASE INCLUDE SASE FOR REPLY.

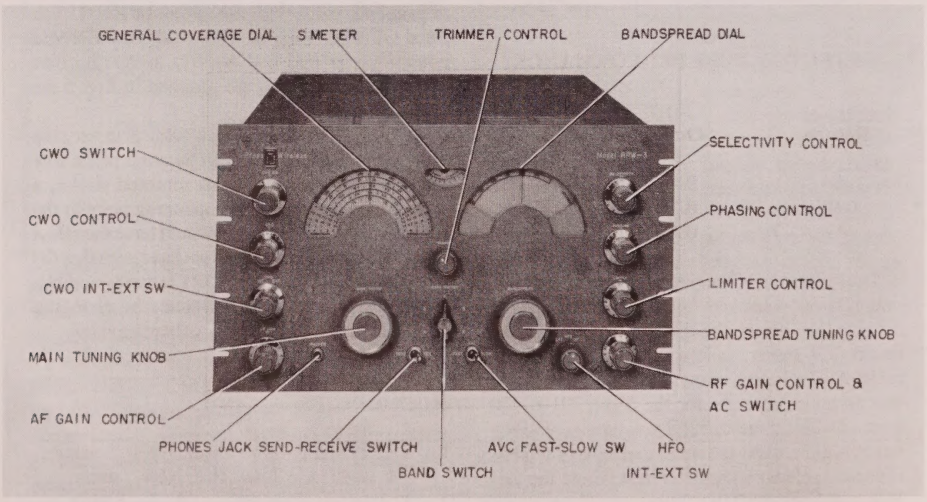
The National Company Model RPW-3 Communications Receiver

When I first discovered the three photos shown here, my impression was that this was a very unusual commercial receiver, and at first glance it does appear so. The fact that it has the logo of the Press Wireless company, coupled with the massive customized tuning capacitor and the 17 tubes shown in the top view, reinforced that impression.

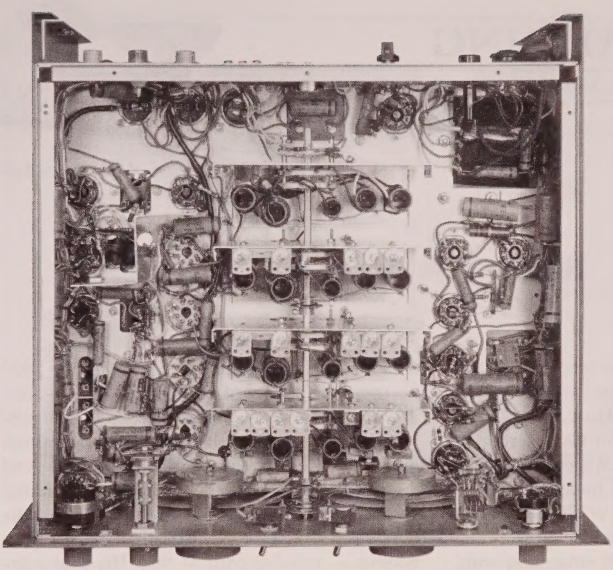
Then reality set in, and the more I studied the photos (I don't have the receiver) the more it became apparent that this was nothing more than a slightly modified NC-183R. However, that does not detract from the fact that it is a superb piece of craftsmanship, and I am sure that it must have worked very well for its intended commercial purpose, at least when new. This would be before the old-design paper by-pass capacitors and other components, such as resistors, over which National had little control, had a chance to degrade.

So I did some quick comparisons of the two receivers. Both have five band positions, the 183 covering 540 kc to 31 mc in four bands with the 5th being the 6-meter band. The RPW-3 covered 540 kc to 30 mc in four bands, with the 5th covering 200 to 400 kc. Thus the most obvious modification, the changing of the coil specifications for one band, must have been a relatively easy job for the experienced National design engineers.

Other differences? Not much except for the bandspread dial which had only a 0-200 division logging scale, as opposed to the 183 with its detailed amateur bands. The tube layouts and the below-chassis appearances are the same, and both are single-conversion receivers with a 455 kc IF and a standard National crystal filter.



The RPW-3 is basically a slightly modified National NC-183R.



Under-chassis view shows typical National craftsmanship.

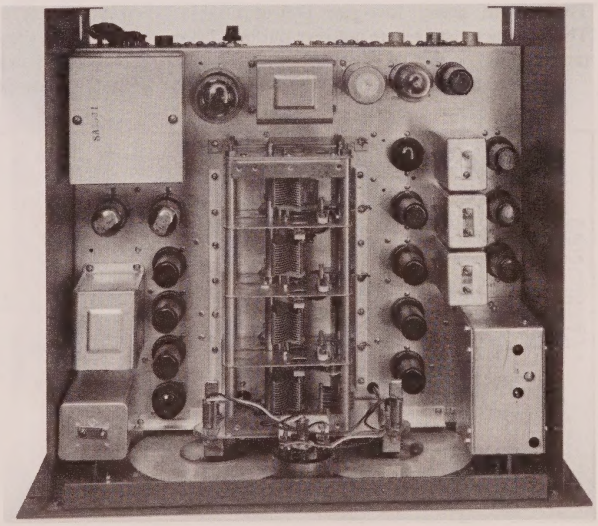
Were many of the RPW-3 receivers made? I rather doubt it, and it is even possible that these National Company marketing department photos were taken of a shop model. After all, all they had to do was modify a stock NC-183, change some engraving on the front panel, make up new dial scales, and change one set of coils from the stock 6-meter set to one for 200-400 kc, items they probably already had in stock. (Assuming, of course, that the 183 came first...it might have been the other way around, and National decided to market the 183 as a spin off from the Press Wireless model.)

But from a collector's point of view, owning one of these RPWs would be a wonderful thing. And just what did RPW-3 stand for? Perhaps...Receiver, Press Wireless, Version 3. Incidentally, does anyone have one?

Note: Sharp eyed readers may note that the 183, which came out in 1947, is advertised with 16 tubes, while the RPW shows 17 in the top-view photo. It appears that at the time of taking the photo someone decided that the accessory socket looked better with something plugged in...thus an extra tube appeared. Even the knob design is the same.

Photo credits: Alan Douglas, taken from his National collection. With thanks.

The 183 was first advertised in 1947 for $269 for the receiver, complete with a matching 10" speaker. Later the price rose to $279, with the 10" speaker for $16 extra. It might be interesting to know the price that National intended to charge the Press Wireless company. Both table and rack versions were available. The rack version, mounted in a customized National rack with the speaker above the receiver, finished in black wrinkle, and with satin-black finish side trim strips, was an imposing product. Today the sight of one is enough to make the heart of any confirmed boat-anchor enthusiast beat just a bit faster.



Here you can see the receiver's massive customized tuning capacitor

BREADBOARDING

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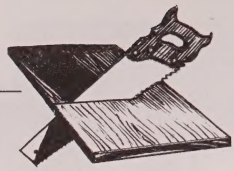

Bring Historical Circuits to Life On Your Workbench!

Regenerative Detectors

Let's get back to business—looking back at historical circuits on the bench. First, I must acknowledge Mr. C. F. "Rock" Rockey, who sent me a copy of his paperbound book "Secrets of Homebuilt Regenerative Receivers" (1), available from most sources of books on antique radio. Rock (W9SCH) ought to be writing this column! Besides covering all the earlier detectors that I've been struggling with, he gives you 127 pages of clear information, circuits, and neat hints on building several different regenerative receivers. For now, though, here's my take on this big breakthrough in radio engineering.

The phenomenon of regeneration is generally said to have been discovered by Edwin Howard Armstrong, who got patent number 1,113,149 on October 6, 1914 for the invention he made in 1912. Armstrong was experimenting with the only tubes then available— triode audions. These were, gassy, low-gain and unreliable. Their characteristics were not very uniform from unit to unit.

In one of his patent drawings (2), we can see (Figure 1) that he didn't make use of a grid leak; his tubes had plenty of gas ions in the grid-cathode space and stray leakage paths that could prevent what we now call "latch-up," a gradual build-up of negative bias toward cutoff. And there are coils everywhere; Armstrong submitted six different circuits in his application, and inductors appear in every possible place in the hookup— variable coils at that. His patent includes a version familiar to us, and I've redrawn it with a couple of changes as Figure 2.

Here's what Armstrong discovered: if the amplified signal at the plate can be coupled back *in part and in phase* to the grid, then a reinforcement of the grid signal takes place. Of course, if too much reinforcement, or positive feedback, takes place, the tube begins to oscillate. Wow! Did Armstrong discover the oscillator? Well, that's another topic, isn't it?

His receiver circuit did the coupling by means of the extra coil—he called it a "tickler"—in the plate lead. Varying the tap, the position of the coils, and even the filament current, changed the amount of coupling and therefore the amount of regeneration. He might have achieved a gain of five or ten with the tube alone, but with controlled positive feedback, he could achieve orders of magnitude (10× each) more gain in the earphones.

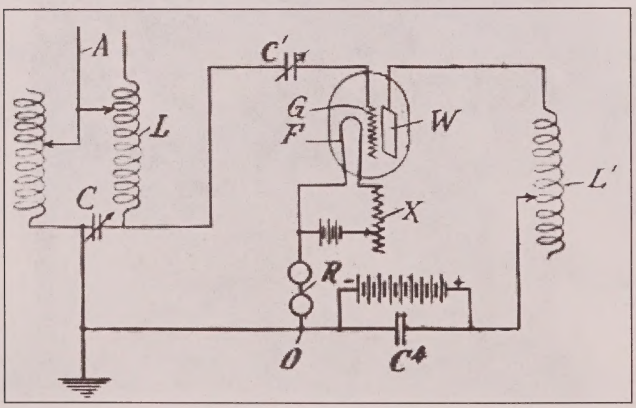

Fig. 1. One of Armstrong's patent drawings for the regenerative circuit.

As the circuit approached maximum controlled gain, he could hear a "hiss" in the phones—this was radio noise, of course. Then, with a "plop," the tube would begin to oscillate and apparent gain took a drop. Folks who built or bought

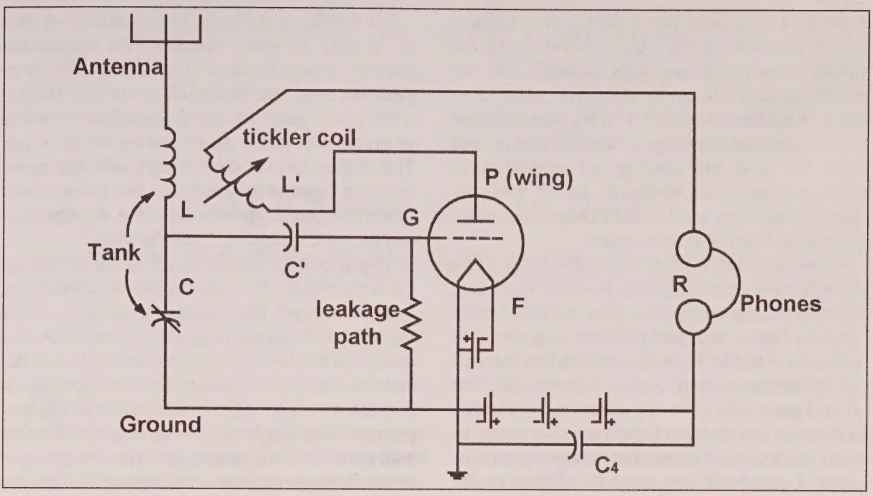

Fig. 2. Redrawn version of an Armstrong patent drawing.

the early regenerative receivers were instructed to operate just short of the "plop," so as to avoid sending low-power RF carriers all over their neighborhoods!

Let's get to the bench and learn some of the things that made regenerative receivers practical. I've built up a one-tube receiver, based on the circuit of Figure 2, on a "chassis" made from pieces of copperclad (Figure 3).

As you can see, I've used the four-inch antenna coupler that I had on an earlier breadboard, and the tube is a type '30—I just like the way it looks! To avoid hand capacity effects, I soldered a front panel to the base plate, and DC power comes from the kluge power supply in my last column. I use 2.0 volts for the filament and about 35 volts for the plate supply. The schematic I wound up with is shown as Figure 4.

When you breadboard a circuit, surprises await you. First I forgot the grid capacitor and all I got was tube microphonics. Next, I couldn't achieve oscillation. In his book, Rock says to stay away from a rotating tickler coil—my first approach—but gives rules for choosing how many turns it needs.

I figured it would depend on the gain of the tube in use: the '30 has a mu, or voltage gain, of 8, so maybe the tickler only needs ⅛ of the number of turns on the tank coil. But no straight amplifier ever realizes all the tube's gain, so maybe ⅓ is a better choice.

My tank has 60 turns, tapped at 50 and 40. When I found that my original ten turns weren't

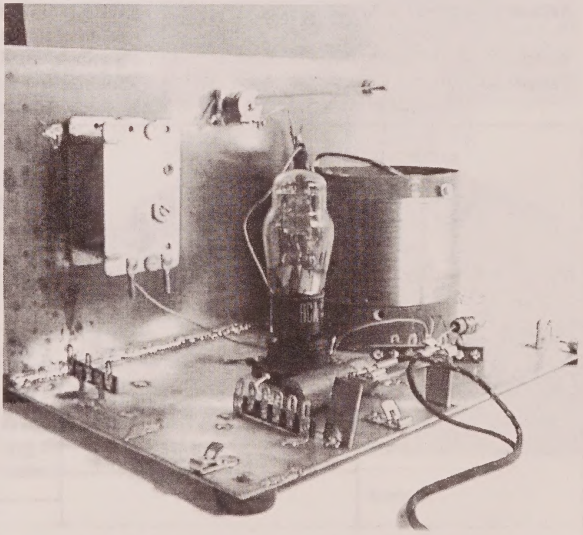

Fig. 3. My experimental regenerative receiver.

enough, I increased the tickler coil diameter, added two more turns, and tried reversing the tickler winding connections. Behold! The receiver came to life, and I wondered what Armstrong must have thought when his phones began singing out code from spark transmitters up and down the band. My rotating coil worked fairly well in controlling feedback, but it was frequency-sensitive, and I couldn't leave it at a single setting from station to station.

Experimenting further, I found out that when the tube was operating with positive feedback, but not too near oscillation, there was RF on the 'phones leads, and performance was variable and unpredictable. Lots of receivers like this call for bypass capacitors across the 'phones, but when I put a 0.02 mFd cap across mine, the circuit squealed loudly. Lowering the value to 0.001 mFd worked better, but, using my oscilloscope, I could still see some RF. Using an RF choke and two bypass caps killed any remaining RF at the 'phones connections.

As to sensitivity, my tests show that even this first try has sensational performance: I shorted out the tickler coil to make the circuit into a straight triode detector, and made the following approximate measurements on a nearby station at 980 kHz:

	'Phones Audio Level	RF 3dB Bandwidth	RF Circuit Q (effective)
Straight Detector	0.1 volt	9 KHz	10
Regen. Detector	3.0 volts	400 Hz	2500

So besides a big boost in sensitivity—a gain of 30 over the basic detector—the regenerator gave me a huge increase in selectivity. This happens because the feedback is tuned; off-frequency, the gain increase drops off more or less in proportion to the amplification of the stage. This makes for ever-narrowing bandwidth as oscillation approaches, even to the point where speech and music quality degrades. Another reason to avoid operating "past the plop."

If you build a circuit like this, see if you get the same results. Can you explain what made my 'phones squeal? How about the polarity of the filament with respect to ground? Remember, the tube, besides being a near-oscillator, has to detect the carrier modulation by rectification, so that the envelope signal takes effect in the earphones. You might want to get Rock's book, or wait until the next column, because I'm going to revise the regeneration control along the lines he recommends, to see if this receiver can be made smoother in its operation.

REFERENCES:

(1) *Secrets of Homebuilt Regenerative Receivers* by C.F. "Rock" Rockey, Lindsay Publications, Inc., Bradley, IL Rev. 1997

(2) Armstrong Historical Website: http://www.erols.com/oldradio

ACKNOWLEDGEMENT:

A grateful "Thank You" to the AWA for presenting the 1999 J.Albert Moore Award to this column.

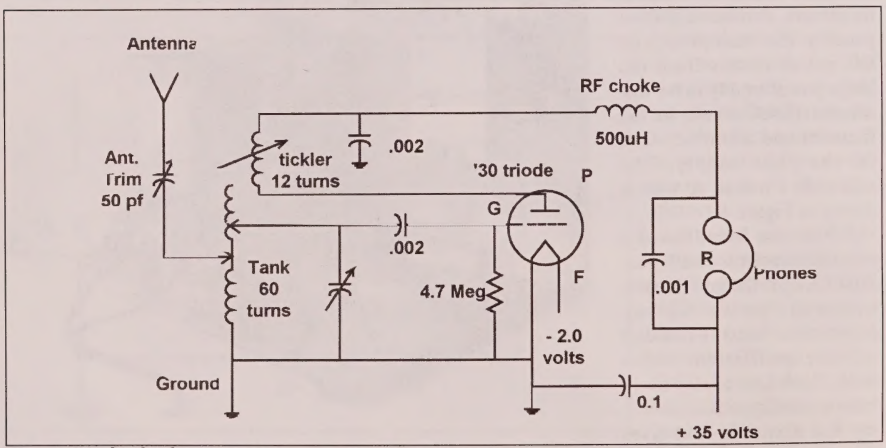

Fig. 4. My final schematic.

BY JAMES P. RYBAK* AND LEONID N. KRYZHANOVSKY**

ALEXANDER POPOV:
FATHER OF RUSSIAN WIRELESS TELEGRAPHY

Alexander Stepanovich Popov is a person whose name is reasonably well known by those in the West with an interest in the history of wireless telegraphy. However his actual achievements (and they are numerous) generally are not so well known. The Cold War was largely responsible for this situation.

During the Cold War, Soviet scientific historians together with other official USSR spokespersons vigorously promoted the claim that it was Popov, and not Marconi, who should be credited with "inventing" wireless telegraphy or "radio" [1]. The fact that these and other USSR advocates of that time routinely exaggerated many claims of Soviet achievement tended to cause people in the West to dismiss all such claims as "propaganda." Consequently, and unfortunately, Westerners often minimized or completely ignored the legitimate accomplishments of virtually all scientists heralded by the Soviet Union.

This article will show that the accomplishments of Alexander Popov were significant and, indeed, should be acknowledged. The issue of Popov's place in history, vis-à-vis that of the other wireless pioneers, is a topic for a subsequent article.

Alexander Popov was born in 1859 in a small industrial settlement in the northern Ural Mountains. He received his secondary education at a Russian Orthodox seminary where he became interested in applied physics. He then enrolled at the University of St. Petersburg, which was well known for its excellent experimental physics program.

Popov thrived in this scientific environment. He loved to design and build laboratory equipment and then use that equipment to conduct ex-

Alexander S. Popov

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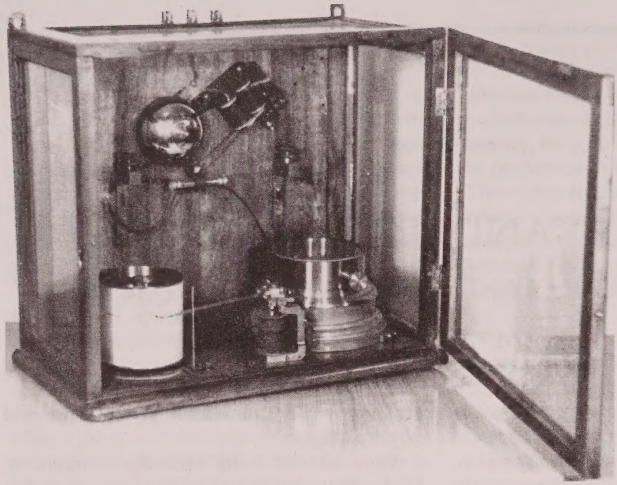


Popov's lightning detection apparatus

perimental investigations. Electricity was the area of physics which especially intrigued Popov. It was the 1880s and the study of electricity was expanding rapidly throughout the world [2].

Shortly after obtaining his doctoral degree in 1882, Popov was appointed to the faculty of the Russian Navy's Torpedo School located at Kronstadt in the Gulf of Finland near St. Petersburg. Here Russian naval electrical engineers and torpedo officers were given an outstanding program of study in applied physics and had available to them the best scientific library and laboratories in Russia.

One of Popov's first important investigations associated with electricity came in the late 1880's when Russia began using electrical power on its ships. Sparks were being observed at the least expected locations when insulated wire was routed along the metal hulls of the ships. Popov determined that the sparking was due to extremely large voltages at high frequencies. The voltages were produced by what we, today, would call "resonance" effects. However, the phenomenon of electrical resonance was not understood at the time.

These observations now focused Popov's attention on finding practical applications of high frequency electrical currents. He had read of Hertz's very recent work which had established the relationship between high frequency electrical currents and the production of radiating electromagnetic waves. Popov believed he might be able to find practical applications for this Hertzian wave theory.

Concurrently, Oliver Lodge also was investigating electromagnetic wave theory. He knew, however, that a sensitive detector of electromagnetic waves was needed. In the course of his experiments, Lodge had observed that two small metallic spheres or "knobs" in light contact, not sufficient to conduct a current, became lightly fused together whenever even a minute spark passed between them. The fusing together was sufficient to allow current to flow easily until the surfaces were again separated by a light tap [3]. This was consistent with a discovery made by Edouard Branly in 1890.

Branly had observed that a thin, non-conducting tube of lightly packed metal filings with a metal plug at each end normally exhibits a very high resistance. When a spark was produced near the tube, however, Branly observed that the metal particles became lightly fused together and the resistance across the tube decreased to a low value. The resistance returned to its original high value when the tube was lightly tapped [4].

Edouard Branly somewhat later would call his filings tube a "radioconductor." Lodge, however, early on coined the term "coherer" for this or any device wherein an electromagnetic wave drastically decreased the electrical resistance between metal surfaces by causing them, as he understood the process, to lightly fuse together or "cohere" [3].

Lodge experimented with both a "metallic sphere coherer" and a "filings tube coherer." It soon was clear to him that the filings tube coherer was more convenient for the detection of electromagnetic waves than was the metallic sphere coherer. Lodge had improved the sensitivity of the filings coherer by evacuating the air from the tube. He also had found that the size of the tube as well as the size of the metal particles and the pressure exerted on them by the end electrodes affected the sensitivity. In addition, Lodge incorporated a "tapping back" device driven by a clockwork mechanism to periodically restore the coherer to its high resistance condition [3].

Alexander Popov had read of Oliver Lodge's use of a tube of metal filings to detect electromagnetic waves over short distances. Popov was intrigued by the use of this coherer as a detector

of Hertzian waves. Popov further increased the sensitivity of the filings coherer through considerable experimentation. He also developed an improved tapping back mechanism, which functioned automatically after the detection of each pulse of electromagnetic waves. With this improved coherer, Popov conducted a demonstration in 1895 which forms a substantial part of the claim of his proponents that he should be recognized as the "inventor" of radio [1].

On May 7, 1895, Popov demonstrated his "instrument for the detection and recording of electrical oscillations" at a meeting of the Russian Physical and Chemical Society held in St. Petersburg. With this device, he could detect the atmospheric lightning discharges associated with approaching thunderstorms. It was clear that this instrument would be valuable for weather forecasting. Popov's demonstration was a significant scientific achievement for that time even though it did not involve the transmission and reception of a message. Clear records of the design of this instrument and of its demonstration were written and preserved [5, 6].

Popov created the lightning detection instrument by connecting one end of his improved coherer tube to a wire antenna. The other end of the coherer was connected to a good earth ground. When the electromagnetic waves produced by a lightning discharge reduced the resistance of the coherer, a relay which controlled a pen mechanism recording device was activated. The pen made a mark on a slowly rotating cylinder to record the occurrence of the lightning discharge.

The concept that a filings coherer might be used to detect thunderstorms did not originate with Popov, however. The fact that a substantial decrease in the resistance of a filings tube occurs during a thunderstorm had been recognized since the 1850s although the reason for the decrease was not at all understood [7]. Numerous other investigators who experimented with the coherer effect in the early 1890s also had noted this phenomenon [7, 8].

A detailed description of Popov's lightning detection instrument appeared in the January-March issue of the *Journal of the Russian Physico-Chemical Society*, a highly respected Russian scientific quarterly. Popov concluded his paper with the statement "With further improvements in my apparatus, it can be applied to signaling at a distance using fast electrical oscillations as soon as a source of such vibrations is found possessing sufficient power" [5, 6]. Popov mistakenly believed that increased transmitter power, rather than increased receiver sensitivity, was the key to successful long distance wireless communication.

Popov had tried to use an induction coil spark discharge "transmitter" to investigate the possibility that it and his coherer detector "receiver" could be used as a wireless telegraphy system. He clearly understood that, for best results, it was necessary to attach one side of the coherer to an antenna and the other side to an earth ground connection. For some unexplained reason, however, he did not initially realize that it was equally important to make the same types of connections to the induction coil transmitter.

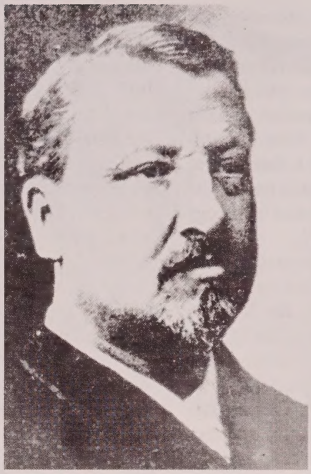
Since Popov neither grounded his transmitter nor used a transmitting antenna, his equipment could be used for signaling only over very short distances. The maximum distance his signals could span was approximately 70 meters. Nevertheless, Popov's filings tube coherer, when connected to an earth ground as well as to a vertical wire or to a lightning rod which functioned as an antenna, later was used successfully at a Russian meteorological station as a recorder of lightning discharges [1]. Marconi conducted demonstrations of his wireless communication equipment in England beginning in July of 1896. His second demonstration, in September of that year, showed that successful communication was possible over distances of almost 3 kilometers. The reasons for these successes quickly became known to Popov, once details concerning Marconi's equipment was released publicly in 1897 [9]. Specifically, Popov now realized the benefits Marconi had achieved by using a transmitting antenna and by grounding one side of the transmitter. After abandoning his wireless experiments for approximately a year, Popov now quickly adopted and adapted these strategies to his own equipment and began communicating over much longer distances than he had previously.

Although Marconi's receiver was very similar to Popov's, there is no indication that Marconi "copied" or even was aware of Popov's design. Both men had known of Lodge's receiver which utilized a filings coherer. It seems almost certain that both Popov and Marconi had independently based their designs on Lodge's work. Popov, himself, readily acknowledged in 1900 that "in all probability" Marconi knew nothing of his (Popov's) receiver [10].

Clearly, Popov deeply regretted that he, himself, had not realized the importance of using an antenna and a ground connection with his transmitter. He also regretted having let other scientific investigations and responsibilities divert his attention from wireless telegraphy for nearly a year following his May 7, 1895 demonstration.

However, Popov felt no ill will toward Marconi for the recognition and praise which the latter now was receiving.

Alexander Popov always graciously acknowledged Marconi's priority in making wireless telegraphy a practical method for long distance communication. In his 1900 comments, Popov clearly stated that: "It is beyond all question that the first practical results in wireless telegraphy over considerable distances have been attained by Marconi before all others" [10].



Eugene Ducretet

Information concerning Popov's work soon became known outside of Russia. The French instrument maker and entrepreneur, Eugene Ducretet, became especially interested in Popov's achievements. He initiated an active and extended correspondence with Popov in 1898 to learn more of the latter's work. Ducretet was interested in developing, manufacturing, and selling wireless telegraphy equipment that did not violate Marconi's strong patent protection [11]. Popov had not patented his lightning detection instrument.

Marconi, on the other hand, had aggressively sought patents for his wireless equipment in as many countries as he could. However, he had been unsuccessful in obtaining patents in France, Russia, and Germany. The reason for this may have involved nationalistic prejudices in those countries' patent offices together with feelings that Popov may have established a stronger position of priority than had Marconi [11].

Ducretet began experimenting with wireless telegraphy in 1897 using equipment based on Popov's ideas together with his own improvements. He began selling wireless telegraphy equipment in 1898 under the brand name "Popoff - Ducretet." ("Popoff" is an obsolete Western spelling of "Popov.")

Marconi was advocating that wireless telegraphy is extremely valuable to ships at sea. Popov wanted to demonstrate to the Russian Navy the value wireless telegraphy would have for its ships. He convinced the Navy to purchase three complete wireless stations from Ducretet for testing on warships of the Black Sea fleet. The trials were conducted in September of 1899 and communication ranges of up to 30 kilometers were achieved [2].

More evidence of the value of wireless for naval ships came in November of 1899 when the Russian battleship *General-Admiral Apraksin* ran aground on Hogland Island in the Gulf of Finland. Because of the likelihood that the winter ice would badly damage the ship, efforts to free it were begun immediately.

No direct communication link existed between the mainland and the island and it was not possible to lay a submarine cable for that purpose. The only choice the Navy had was to ask Popov to establish communication with the stranded ship using the wireless telegraphy equipment from the Black Sea trials [2, 11].

Due to a variety of problems, the 45 kilometer wireless telegraphy link to the island was not completed until early February of 1900. One of the first messages received was a report that an ice-floe with 50 Finnish fishermen had broken loose nearby in the Gulf of Finland. An icebreaker, which had brought supplies and was trying to free the *Apraksin* was immediately ordered to rescue the fishermen. Within 24 hours, all the fishermen had been saved, thanks to wireless telegraphy [2, 12].

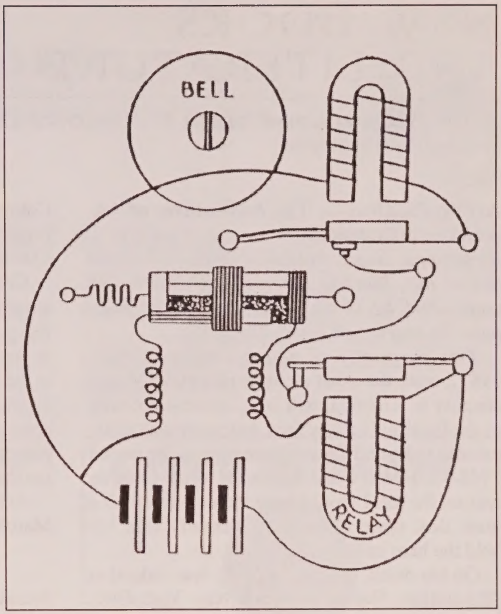
The wireless link to Hogland Island was used until the Apraksin was freed at the end of April. During that time, 440 official telegraph messages were handled [2, 11, 12].

The Russian Navy now was convinced of the value of wireless for its ships. Ducretet's company supplied 25 wireless stations to the Russian Navy between 1899 and 1904. Popov was responsible for overseeing the installation of this equipment. Popov also oversaw the manufacture in Kronstadt and the subsequent installation of equipment similar to that being produced by Ductetet. It appears that Ducretet's firm was unable to produce equipment at a faster rate. Consequently, when the Russo-Japanese War appeared imminent in 1904, the Russian Navy realized that it needed much more wireless equipment. The Navy followed Popov's recommendation and purchased a large number of wireless stations from Germany [2, 11].

As a result of Popov's recognized abilities as both a teacher and a scientist, he was awarded the Chair in Physics at the St. Petersburg Elec-

trotechnical Institute in 1901. Because he also demonstrated considerable administrative skills, Popov was elected Director of that Institute in September of 1905. Regrettably, he served in that capacity for only four months. The political situation in Russia was very unsettled in 1905. The Tsar's policies were becoming more and more oppressive and the country was moving close to civil war. Popov was ordered by the government to suppress the increasingly anti-government political activities of the students at the Electrotechnical Institute. This deeply upset Popov as he always had been a strong believer in both academic and political freedom.

Popov's health had never been especially strong due to the demanding pace he had always set for himself. In addition, it is believed that Popov may also have been suffering serious ill effects as a result of exposure to x-rays. Popov had conducted extensive experiments with x-rays immediately after having learned of their discovery by Roentgen in 1895 [11]. The Russian government's order to Popov to take action against what he considered to be legitimate student political activities devastated him. Alexander Stepanovich Popov suffered a brain hemorrhage on January 10, 1906 and died three days later at the age of 46 [2, 12].



Schematic diagram of Popov's receiver

[The authors wish to thank Khatskel Ioffe, retired Department Head at The Popov Central Communications Museum in St. Petersburg, Russia for the photographs used in this article.]

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NEW BOOKS AND LITERATURE

EDITED BY **WILLIAM E. DENK, W3IGU**, 81 STEEPLECHASE RD., DEVON, PA 19333-1226
PLEASE INCLUDE SASE FOR REPLY.

Arthur Godfrey — The Adventures of An American Broadcaster

By Arthur J. Singer, Published 2000. McFarland & Co., Inc., Box 611 Jefferson, NC 28640. 246 pages, 7¼" by 10¼", hardcover, $43.95 postpaid. To order, call 1-800-253-2187.

This biography of Arthur Godfrey (1903-1983), once the most recognized radio/TV personality in America, will be of interest not only to the Godfrey's many fans, but to anyone interested in radio and TV programming in the period 1948-72. I wish I had this book when Godfrey was on the air. I would have viewed him with a great deal more respect. Incidentally Godfrey held the ham call K4LIB.

On his death, Godfrey's estate was valued at $2.5 million, But he was born (New York City) into a family living near the poverty level. As a youngster, he earned 25 cents on Sundays pumping air for the church organ.

One of the entertainer's first real jobs was working in a coal mine near Clymer, Pennsylvania. Later he worked as a tire finisher for Goodyear Tire & Rubber Company.

In 1920, Godfrey joined the U.S. Navy. He chose Radio School and soon passed the 15 wpm test, following which he was made an assistant code instructor.

In 1924 he went to Detroit where he got a job as a body finisher. Next he landed a job as a cemetery lot salesman, once earning $10,000 in five months, an indication of his growing skills as a salesman.

Later, in Washington, while studying to become a Radioman, First Class, he was listening to a local radio station, WFBR, airing an amateur show appealing for anyone who could sing or play an instrument. Godfrey responded and entered the show, singing and playing his banjo.

The station was impressed, and hired him to do three 15-minute performances per week. He was billed as "Red Godfrey, the Warbling Banjoist" at $5.00 per show, Thus began a career that lasted over 50 years. Although it later bothered Godfrey's superiors at CBS, he typically went on the air with no script.

It was new to this reviewer that Godfrey was an accomplished aviator. Over the course of his life he logged over 11,000 hours in planes of every variety. He once flew a Rockwell "Jet Commander" around the globe, a 23,333 mile flight which included 20 refueling stops, made in 55½ hours of flight time.

Godfrey was authorized to fly virtually any aircraft owned by the U.S. Air Force and U.S. Navy. At the time of his death he had flown close to two thirds of all aircraft models manufactured in the U.S. during his lifetime. Air Force General Curtis LeMay once stated "Arthur Godfrey's constant devotion to adequate American airpower....has done much to help our people realize the need for overall air superiority."

Arthur Godfrey died of cancer on Wednesday, March 17, 1983.

♦ ♦ ♦ ♦

Speaker Articles

By Floyd A. Paul. Published 2000 by Floyd A. Paul, 1545 Raymond Ave., Glendale, CA 91201. Soft cover, 8½" by 11" inches, 51 pages. $11.50 plus $2.00 S & H. Order from the author (818-242-8961).

Floyd Paul is well known to AWA members for his many interesting articles, extending over a period of twenty years, on the subject of loudspeakers, All of the articles were originally published in *The OTB*, but are now available as reprints in this new book.

Floyd is a well informed writer, and here he has written about his favorite subject. The book's index includes 112 entries, running from A-1 Woodworking and Ackerman to Winkler-Reichman and Yahr-Lange. Floyd's first article appeared in the September 1980 *OTB* (before many of us were members) and was titled "History of the Rola Company 1923-1980." His most current article appears in this issue.

Yes, it's true that you can dig up the originals of these articles in the last twenty years of *The OTB*. But it is certainly convenient to have this a nice overview of U.S, loud speakers and their manufacturers between the covers of one book.

♦ ♦ ♦ ♦

The American Crystal Set: A Guide to the Brand Name Crystal Sets Made in the USA — 1919-1926

By Fin Stewart. Published 1999 by the author. 14 pages, 6" by 8¼", softcover, $5.00 U.S. Order

Made in Los Angeles

Several readers have asked me to provide a complete list of horns known to have been made in Los Angeles. Although such horns have been discussed individuallly in previous *OTB* articles, here is the list all in one place. In parenthesis after each brand is the time period during which the brand was marketed.

A-1 Woodworking (1925 and 1926)
Advance Electric (mid 1925 and 1926)
Aerofonic (1928)
M.J. Carls (late 1925)
Chanson (1926)
Ovenshire (mid 1925 and 1926)
R.W. Powers (late 1926)
Stentorphone (mid 1923 to mid 1925)
Turner (late 1925)

I consider the Stentor "Super Speaker," the Ovenshire, the Advance Electric , and the R.W. Powers "The Woodlark" to be the scarcest horns from this group. Only one Stentor model ("The Stentorphone") and one Powers are known to exist in collections.

Coming Soon: Speaker Article Compendium

I'm now putting together a booklet containing reproductions of all the articles I've contributed to *The OTB* over the past twenty years. It will include some eighty articles on horns and cones with an index of manufacturer's names. Co-authors will be credited and references will be given to dates of original publication.

Please drop me a line if you feel you might have an interest in obtaining a copy. This will help me decide how many booklets to print. The booklets should be available some time in the next three months.

"Listen to the Woodlark"
ALL WOOD
NO METAL
Model "A"—$15.00
MASTER OF AUDITION
Entirely new in principle. Exclusive adaptation of the better features of both cone and reflex speakers.
The tone chamber is so constructed that it permits full freedom to all harmony waves. Tonal quality, rich and mellow in the lower scale, yet instantly in tune with the clear high notes of the flute or violin.
The volume is unbelievably great. Distant signals amplified with fidelity.
Extremely light and compact (slightly over eight inches in all). It may be transported without fear of breakage. Will not warp, twist or buckle. Not subject to climatic changes.
The Woodlark
Finished in walnut. Hand rubbed and polished
A Product of Unusual Merit
Circulars on request
California Distributors
C. W. SMITH COMPANY
WHOLESALE RADIO
1125 Wall Street
Los Angeles

This is the only known advertisment for "The Woodlark" by R.W. Powers. (From Radio Doings *for August 28, 1925)*

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directly from the author at "Cockerdale," 380 Bulga Road, Wingham, NSW 2429, Cash Preferred.

This booklet lists over 200 crystal sets (!) with dates, and fifteen crystal detectors. Included are schematic drawings of several of the sets. The author drew his information from various American radio magazines of the Twenties and a catalog of the Harold Greenwood Historical Radio Collection.

BY GEORGE GRAMMER

ROTTEN SIGNALS: HOW TO CURE THEM

A Talk About the Essentials of Transmitter Tuning

Reprinted from *QST* for April, 1933 with permission of *The ARRL.*

Was it the legendary Hiram Percy Maxim, writing in QST *under the pseudonym "The Old Man," who began the famous series of "Rotten" articles aimed at cleaning up sloppy amateur radio practices? One of our knowledgeable ham historians will have to confirm this. At any rate, this 1933 addition to the "Rotten" series was written by the equally legendary George Grammer, who at the time was a mere Assistant Technical Editor at* QST.

George's article was aimed at helping the fraternity eliminate chirp and "r.a.c." (raw a.c., I presume) signals from their self-exited rigs. As the builder of a couple of Bruce Kelley 1929 QSO party Hartleys, I can vouch for the fact that George's very complete treatment addresses most of the questions that arise when trying to get one of these rigs to work well and sound good.

The article was called to my attention by Bill Beckett, W2NBK, who sent me a good photocopy. It seemed quite appropriate to run it in this issue—where we are reporting the results of the December "party" (see the Amateur Radio Column). The article is reprinted here almost exactly as it appeared in QST, *except that standard* OTB *typography is used and additional paragraph breaks have been inserted for easier reading.—MFE*

Fully half the letters intended for *QST*'s Correspondence Department recently have dealt vehemently with rotten notes, especially of the 40- and 20-meter variety. In almost every case a self-excited transmitter is responsible—probably in most cases a transmitter using something bigger than a 210. Now a raspy r.a.c. note may be all right for the fellow behind the key; he doesn't have to listen to it. But it's all wrong for the other 90% who take some pride in putting out a clean signal; theirs are the ears that suffer. When the day comes that we all have single-signal receivers the rotten note problem will cease to exist—that type of signal is unreadable on a really selective receiver and loses most of its power to cause QRM. But right now the "mud-like r.a.c." is on the increase.

The principles of correct transmitter adjustment were established long years back. After doing some listening to things flying around in the ether these days we began to wonder whether the old rules had lost their effectiveness. As a matter of curiosity we built a typical self-excited transmitter, using a tube which by all indications ought to be one of the least satisfactory at high frequencies, and rediscovered, with much satisfaction, that the old precepts were quite up to snuff. Evidently the answer is that they're not being applied.

What's in a Transmitter?

A self-excited transmitter has four divisions: an oscillator tube and circuit, a power supply, an antenna system and a monitor. Some people have tried to get along with only the first three with results which are evident. The fourth is just as essential to a good transmitter as any of the others. It doesn't matter much what kind of monitor it is—it may simply be the station receiver if the latter is well enough shielded—so long as the oscillator in it is steady and capable of giving a beat with the transmitter. Therefore the first recommendation is: Get a monitor. Obviously, it's

impossible to tell whether a change has made any improvement if there is no way of listening to the transmitter.

Circuits

In performance, the different circuits—Hartley, tuned-plate tuned-grid, and so on—are practically identical. Whether or not the results are good is entirely a matter of how the circuit is handled. There are only two objects in the adjustments one makes to a transmitter—power output and frequency stability. The last is just as important as the first.

Frequency stability is not a matter of a single adjustment or a single feature in the transmitter. There are at least four ways in which instability can get into a transmitter. The first is through changes in frequency caused by changes in plate voltage, or dynamic instability. If we plot a curve of oscillator frequency against changes in plate voltage it will be found that as the voltage is increased from zero there will be a continuous frequency change until the final voltage is reached. The extent of this change is a measure of the dynamic instability of the transmitter.

On a small transmitter with but 500 volts on the plate the change in frequency can be 20 kilocycles or more at 7000 kc. if the set is poorly designed and incorrectly operated. Naturally it will be worse if the plate supply is 1000 volts or more. With a poorly-filtered plate supply the note from such a transmitter is going to be r.a.c. hash, because the frequency will be flitting gaily back and forth at the plate-supply ripple frequency.

The remedy for dynamic instability is to be found in the use of a large ratio of capacity to inductance in the oscillator circuit, and particularly in the plate tank circuit if the grid and plate are separately tuned. In other words, High C. This does not necessarily mean an inordinately large tuning condenser. We know that few hams operating 203-As and 852s have high-voltage variable condensers with a maximum capacity of 500 mmfd. But nearly all of them have 220- or 250-mmfd condensers, and those condensers are big enough *provided the coils are cut so that the band is hit with the condenser plates practically all the way in.* Paring down the coil is the first step toward eliminating dynamic instability.

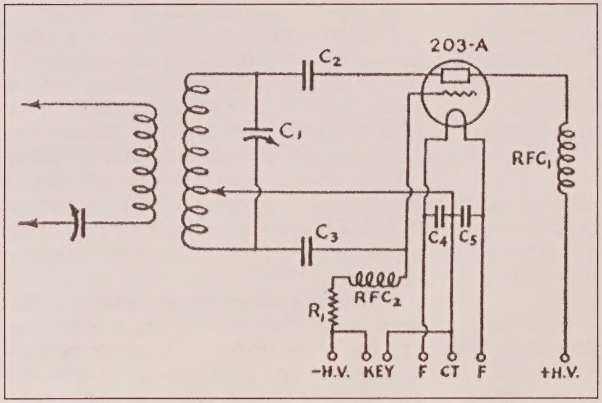
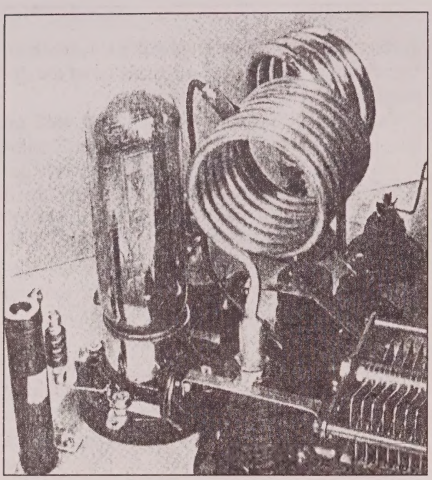


Fig. 1—The Hartley circuit used in the transmitter shown in the photographs. Cl—220 mmfd transmitting condenser; C2—500 mmfd, 500-volt mica condenser; C3—250 mmfd mica condenser; C4, C5—.005 mfd mica condensers; Rl—10,000.ohms, 50-watt rating; RFC1—plate choke, similar to G.R. Type 379-T. Has three ¼-inch-deep slots, spaced ¼-inch apart on 1-1/8-inch wood spool. First slot ⅛-inch wide, second 3/16-inch wide, third 5/16-inch wide. All wound full of No.34 d.s.c. wire. RFC2—May be same as RFCl. Actually used National Type 100; The tank coils are ¼-inch copper tubing, inside diameter of coils 2⅝ inches. Three turns for 14 mc.; 8 turns for 7 mc. Antenna coupling coil and tuning condensers as usual for type of antenna or feeder system used.

Other Considerations

Once the coil has been cut down so that about 200 mmfd can be used to tune it, attention should be given to the excitation and the grid leak. Both—and they are not independent of each other—have far more to do with the final condition of the note than most amateurs realize. If the tube is to work at reasonable efficiency it must have high bias, which in turn calls for a high-resistance leak and plenty of excitation. The dynamic stability is improved under the same conditions. The excitation must be adjusted with a load on the oscillator. The setting which gives



Tank circuit leads should be short to keep down the losses. The leads here are half-inch wide soft copper strip and go directly from the condenser to the G.R. standoffs into which the coils fit. The ends of the coils are sweated into the new G.R. transmitting plugs. The same copper strip is used to connect the tank circuit to the tube socket through the grid and plate blocking condensers. The grid leak is mounted vertically on a corner of the baseboard, with the grid choke going directly from the upper end of the leak to the grid terminals on the socket. This view shows the 7-mc. coil in place.

the least plate current when the oscillator is not delivering power to an external circuit is invariably the wrong one; the excitation will be insufficient under these conditions and the stability will suffer.

As a general rule, the no-load plate current should be at least half the load plate current, although this depends somewhat on the frequency. The excitation is increased in the Hartley circuit by moving the filament tap nearer the plate end; in the t.p.t.g. by increasing the capacity of the grid tuning condenser. Since the adjustment is critical it is best to make changes in very small steps, watching the input and output and listening in the monitor. Listen especially to the character of the signal when it is keyed. If the circuit is High-C a key chirp is an almost certain indication of insufficient excitation, with the exceptions noted later on.

Use the highest value of grid leak resistance that will permit the tube to oscillate stably with normal input—between 10,000 and 20,000 ohms for a single tube, usually. Too much leak is just as undesirable as too little. And remember that the higher the leak resistance the greater is the excitation voltage required, so every time the leak resistance is changed there must be a corresponding change in the excitation tap or condenser setting.

Efficiency

A high C-to-L ratio brings with it large circulating currents in the tank circuit, hence the tuned circuit leads should be short and of heavy conductor. If the oscillator coils are plug-in, it is also necessary to be sure that the joints make good contact and have low resistance. Coils may be bolted in place or heavy plugs and jacks, lately made available for transmitting coils, may be used.

It is necessary at this point to make a distinction between tube efficiency and circuit efficiency. If the tube is running normal plate current under load and is correctly biased and excited, its efficiency will be as high as in any other circuit regardless of the L-C ratio. The circuit efficiency will be somewhat lower in a High-C circuit, however, because of the greater losses caused by the higher tank current.

The distinction is important because it is necessary for the tube itself to operate at high efficiency if it is to stay cool in operation. And it is highly desirable for the heat dissipation in the tube to be well within the ratings because heat makes the tube elements to expand, which in turn causes the interelectrode capacities to change. Since the interelectrode capacities are unavoidably a part of the circuit, here results the second cause of instability—a slow frequency change or "drift."

The greater the condenser capacity in the tuned circuit, the less will changes in tube capacity affect the frequency. Therefore the same things which give good dynamic stability will also minimize frequency drift—High C, a high-resistance grid leak, and correct excitation. In addition, *the tube must not be overloaded.* The plate should never show signs of color even when the tube is allowed to oscillate continuously for minutes or even hours at a time.

Frequency drift also can be caused by heating of the tank coil and condenser, another reason why the resistance in the tuned circuit must be low. Drift from this cause will be less when power is being taken from the circuit because the tank current decreases with increasing load.

Mechanical Instability

When the electrical features have been taken

into account there remains the third cause of poor notes—lack of attention to mechanical details. Cleaning up dynamic instability and drifting are not in themselves the guarantee of a good note. It is when these things have been done that the smaller—but nevertheless just as serious—causes of instability become apparent. Mechanical vibration of coils, tube elements and condenser plates can utterly wreck an otherwise pure d.c. signal. It's no job at all to pick out "mushy d.c. signals" on the air, which, when the key is held down for more than a few seconds, change into good d.c. And all because the key is mounted right alongside the transmitter on the operating table and the whole transmitter does a shimmy whenever a little brasspounding is in order. Self-excited transmitters should never be placed where they pick up every vibration set up by the operator's movements. Put the set on a separate table, jack it up with sponge rubber, hang it with shock-proof cord, anything you like—but protect it from vibration.

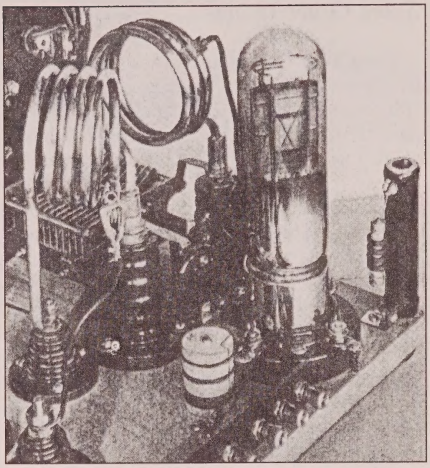
It should be unnecessary to mention that the oscillator itself should be solidly constructed. Short, heavy leads, parts fastened securely so they cannot shake; in fact, every care that can be taken to prevent floppiness is worth while. Furthermore, it's not hard to do and costs nothing.

One excellent way to turn a d.c. note into r.a.c. is to build the oscillator and power supply as one unit. Even the quietest of filter chokes and transformers will vibrate, and when the whole works is rigidly mounted on one frame or baseboard, the vibration is transmitted very efficiently to the oscillator tube and the tuned circuit. The power supply should be put off by itself, mounted on some sponge rubber or felt if necessary. If it is impossible to get a pure d.c. note with a power supply which by all the rules has adequate filtering, the chances are excellent that vibration is responsible.

Antenna and Feeders

After all these things have been corrected there is still the fourth possible cause of instability—frequency warbles caused by a swinging antenna or feeders. As soon as the oscillator is coupled to an antenna or feeder system and power is taken out, the antenna or feeders become a part of the tuned circuit. A Hertz antenna suspended well in the clear can swing a great deal before there is much effect on the frequency, but the feeders are another story altogether.

Zepp feeders especially are likely to be bad offenders, because the wires are relatively close



A view from the other side showing the plate choke and the 14-mc. tank coil. The dynamic stability of this oscillator is such that between plate voltages of 100 and 1000 the change in frequency is less than 1 kilocycle, at 7100 kc., with the transmitter fully loaded. With a similar change in plate voltage at 14 mc, the frequency change is slightly over 1 kc. With an unfiltered plate supply the note is musical r.a.c. and sharp. On 7 mc, the plate current is about 75 ma. unloaded; 150 ma. with load. On 14 mc, the no-load plate current with correct excitation is 120 ma.; fully loaded, 180 to 190 ma.

together and hence have fairly large capacity to each other, so that if they swing back and forth the oscillator frequency may change considerably. For this reason the feeder wires should be spaced at least ten or twelve inches and should be liberally supplied with light-weight spacers.

With light spacers the whole feeder system tends to swing as a unit in a wind, but heavy spacers, because of their greater inertia, cause the wires to whip back and forth. The antenna and feeders should be pulled up tight, of course.

Some capacity coupling always exists between the oscillator coil and the antenna coupling coil, especially when the coupling is tight. This capacity coupling is no value in transferring power to the output circuit, but does help along the harmonic output and makes the oscillator particularly susceptible to capacity changes in swinging feeders. Therefore it is advisable to couple to the "cold" end of the tank because the r.f. voltage is low and little energy is transferred through capacity coupling. The antenna will take power just as readily as when the coupling is to the plate end.

Some Other Things

Even after these four causes of instability have been given the right kind of attention, it is still possible to have a modulated and chirpy signal if the r.f. is not kept where it belongs. Chokes sometimes do not do their duty as they should, allowing r.f. to get into the power supply, which certainly is not helpful.

Sectional slot-wound chokes, sectional honeycombs, and plain single-layer chokes all are good when they have low distributed capacity and have no resonance spots near the amateur bands. A neon bulb is still about as good as ever for testing a choke. If the bulb glows when touched to the supposedly "cold " side of the choke some experimenting is in order. A poor choke decreases the efficiency as well as sometimes being responsible for a poor note.

But r.f. in the power supply is not always a sign of a poor choke. Direct pick-up of r.f. from the oscillator circuit is often more than just a possibility. Power supply leads to the tube should be kept out of the r.f. field as far as possible. Shielding the leads when they come near the oscillator is worth while if the shielding is connected back to the filament center-tap at the filament by-pass condensers.

A ground on the center-tap is advisable if it is short. At 14,000 kc., however, a ground lead sometimes does more harm than good if it approaches a quarter wave in length—a matter of but sixteen feet. The only way to find out is to try it, using the neon bulb and monitor.

Under certain conditions there may be no sign of r.f. in the supply leads with the antenna disconnected, but it appears immediately when the oscillator is delivering power. This is the result of pick-up from the coupling system. It is particularly likely to occur with parallel feeder tuning because of the high voltage at the transmitter end of the feeders with that tuning system. If this happens, move the supply leads out of the field of the antenna coil and feeders or add enough length to the feeders so that series tuning can be used. With series tuning the voltage at the coupling coil and at the transmitter end of the feeders will be low and the electrostatic coupling consequently less.

This brings up the subject of antenna coupling. The right degree of coupling is almost automatically settled if the tube is not going to be overloaded. Simply use the loosest coupling that will make the tube draw its rated plate current with the antenna or feeders tuned to resonance. The character of the note and the keying should be checked in the monitor when the antenna coupling is being adjusted. So long as the monitor says the note is good the coupling may be increased and more power taken from oscillator, for after all it is the signal that is the important thing and not the method of getting it. Put the antenna coil at the " cold " end of the tank for close coupling. Take as much out of the set as you can—but *use the monitor constantly.*

Power Supply

The remaining member of our four transmitter divisions is the power supply. A good power supply—well filtered, and having good regulation—is always desirable with any transmitter; it is absolutely essential with a self-excited set. A poorly-filtered supply cannot possibly. produce a d.c. note. And if the regulation is poor the signal is bound to be chirpy, because in spite of all the things we may do to improve the dynamic stability of the oscillator there will still be some frequency change with changes in plate voltage.

Use a separate filament transformer so that keying will not affect the filament voltage. There is only one way to get good regulation in the plate supply—use a filter with choke input and put in a bleeder which will drain off about 10% of the total current to be taken from the system. Besides having the advantage of good regulation a choke-input filter decreases the peak rectifier current, which increases the life of the rectifier tubes and makes it possible to draw considerably more output current from the transformer and rectifier than is possible with condenser input.

The only disadvantage is that the output voltage is lower than with condenser input at light loads, a disadvantage that rapidly disappears as the load increases and which in the end turns out to be helpful because it cuts out a lot of the strain on the filter condensers. If you have only one filter choke put it next to the rectifier tubes and parallel all your filter condensers on the output side. The filtering will be just about as effective either way. And don't forget the bleeder.

None of the things we have pointed out above are hard to do, in fact, it is no trick at all to get a thoroughly satisfactory note simply by paying attention to details. Possibly it may be necessary to sacrifice a little power output to get a good signal, but that is of little consequence. It takes a big change in power to make an appreciable difference in signal strength, and the small amount that is used up in the interests of having a 1933 signal will never be missed. Neither will the r.a.c. hash the good signal replaces.

MIKES AND MEN

EDITED BY **GEORGE A. FREEMAN**, 101 E. MAIN ST., MADISON, IN 47250-3411. PHONE (812) 265-6878.
PLEASE INCLUDE SASE FOR REPLY.

"Mikes and Men" author George A. Freeman as News Director of WDRC AM/FM, Hartford, CT (1959). His mic is the familiar RCA 77-DX.

Author George Freeman's broadcasting career spans almost half a century. In the earlier part of his career, he served as dj, staff announcer, news director, news reporter, account executive and general manager at stations in Ohio, Pennsylvania, Connecticut, and New York. Recently, he sold the last of a string of six radio stations that he owned and operated: WIKI-FM (Madison, IN/Carrollton, KY); WDGS-AM (Louisville, KY); KGRI-AM and KGRI-FM (Henderson, TX); WQXO-FM and WGON-AM (Munising, MI)

George is a microphone collector and enthusiast. He also has a large collection of photographs showing mics from different eras being used in actual situations. His idea for this new column is as interesting as it is unpretentious. Each month, George will present a photograph of a different mic along with a short discussion of the circumstances in which it is being used and—if known—technical data on the instrument. If all of his columns are as interesting as this one, we're in for some fascinating reading.

—MFE

Traitor!

It's hard to believe you'd be severely punished for listening to the radio. However this poster, distributed in Nazi Germany in 1944, warned of just that. You can make out the traitor ("verrateur") in the lower part of the poster. He looks very furtive as, lit only by the glow of his multiband slide-rule dial, he hunches over to hear the propaganda. The volume has obviously been reduced to a whisper so his local radio warden won't be able to hear the set through the wall or window.

It's doubtful that the microphone shown before the Bolshevik announcer would have been in a Radio Moscow studio. It appears to be a German Georg Neumann Co. CMV-3 "bottle" condenser microphone. This model was often used by Adolph Hitler.

I have a Neumann U-891 mic (c1978) in my collection which echoes the design concept of the poster mic. Using back light to look through the wedge-shaped pop filter at the top of my unit, I can see the same "round element atop a pole" configuration.

I'd be very pleased to hear from readers who would like to share information about any of the mics discussed in this series.

The "traitor" poster

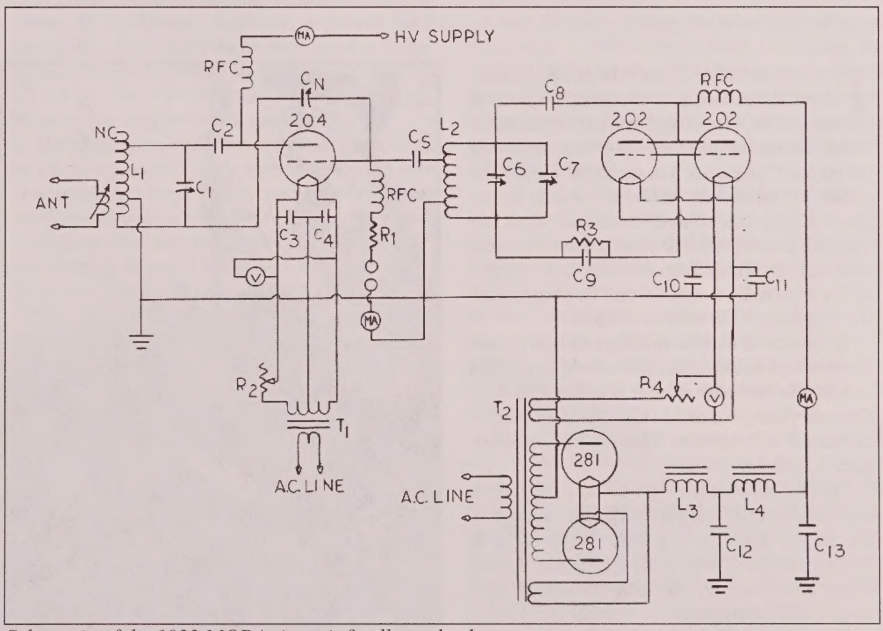
BY ROBERT L. GUNSHOR, W2LDM

EVOLUTION OF A 1922 MOPA TRANSMITTER

You may not be able, exactly, to duplicate the rig Bob describes here. He has used some rare vintage components, including a few with unknown values. But as its title implies, this article is really about philosophy rather than construction. The author takes us along on his adventures with 1920s transmitter technology—beginning with simple one-tube TNT and Hartley rigs and progressing to a three-tube MOPA. Looking over his shoulder as he designs the MOPA, we watch him grapple with those conflicts about authenticity versus efficient operation faced by every serious builder of replica vintage equipment. You'll find much food for thought.—MFE

This article is dedicated to my friend and mentor, the late Glenn Rogers, W9ASX who became a silent key in July 1995. He would be delighted to know that his key is not really silent, however, as it (the circa 1915 Vibroplex Original which he favored for his own use and passed on to me) is connected to the transmitter described here. The MOPA (master oscillator power amplifier) project discussed in this article turned out to be a lot of fun, and the thought was that some of you would find a description interesting, and/or would enjoy setting my likely frequent misconceptions right.

I have been using early rigs on 80 meter cw



Drafting by John Haught.

Schematic of the 1922 MOPA rig as it finally evolved.

AUTHOR'S ADDRESS: P.O. BOX 164, SANDWICH, MA 02563

for some time. These have not just been used to participate in the AWA events, but have also served for casual QSOing on the band. Of course the latter places some boundaries on how outrageous the signal can sound! We have all enjoyed the variety of cw notes heard during the AWA tests. Although the sounds of a duck quacking are appreciated at such times, and even sometimes envied (at least by me), they are not suitable for communications with our more sober cw bretheren who populate the low end of 80.

Using an early rig on a regular basis is an extremely rewarding challenge, and can really take you back to the days before satellites, especially when chasing DX. Incidentally, the working of DX places some minimum requirement on signal quality as well.

My first attempt at a vintage rig was a TNT using a 245 tube. It took only a few hours to construct (once the varnish dried), then about six weeks of tweaking, a couple of power supplies, various antenna coupling arrangements, and a range of grid leak resistance values before the signal was acceptable for "everyday" use. (I should state that during the course of these projects Glenn Rogers was a constant source of encouragement and advice.)

Sometime after the 245 project, I uncovered a couple of Western Electric tipped 211D tubes, complete with the original boxes and paper work. This event led to the idea for the next rig. The thought was to go from about a 6 watt output (the TNT) to a somewhat higher power with a single 211D. Of course the power level would be somewhat limited by the need to maintain a low degree of coupling to the antenna in order to minimize both keying chirp and frequency pulling by the antenna.

The new rig thus materialized as a Hartley using a single 211D. This turned out to be a fine sounding rig at about 18 watts output. One other factor limiting the power capability of these rigs was the keying method used (the key was typically in the B minus return). The problem usually came when reaching across the key to adjust the rf gain control of the 1935 HRO receiver! The not sufficiently infrequent jolts led to an arbitrary voltage limit of about 600 volts. I seemed to survive this level, at least with only one arm involved, so why look for trouble?

The 211D Hartley was built on an actual breadboard, and had a ¼-inch copper tubing coil

PARTS LIST FOR THE 1922 MOPA

L1 .....RCA UL-1008 "oscillation transformer" (flat wound coil on wooden base)
L2 .....9 turns of ¼-inch copper tubing, 2½-inch diameter
L3,L4.....RCA UP-1626 filter reactors
RFCs.....Rfc; the 204 grid rfc is 2.5mH; the other two are homemade with unknown number of turns — a trial and error process
C1 .....Early Cardwell to resonate in 80 meters
C2 ..... .002 mfd
CN .....Early Hammarlund adjusted to minimize signal feedthrough
C3,4 ..... .008 mfd micas
C5 .....RCA UC-1803, 25pF, with additional mica in parallel to adjust coupling
C6 .....Early Cardwell for roughly resonating L2 to frequency
C7 .....National frequency meter condenser for fine tuning
C8, C9.....500 mmfd mica
C10, C11... .004 mfd micas
C12,C13...See text
R1 .....3.5k ohm, 10 watt
R2 .....RCA PR-535 filament rheostat (designed for UV-200, 201 and 202)
R3 .....5.0 k, 10 watt
R4 .....RCA PT-537 filament rheostat (designed for UV-203 and 204))
T1 .....See text
T2 .....RCA UP-1368 power transformer

Notes: The tube sockets are also as illustrated in the 1922 RCA catalog. All mica capacitors are molded with screw terminals

of 12 turns (giving a reasonably high C/L ratio) tuned by a national DX capacitor in parallel with a National frequency meter capacitor used for bandspread. The bandspread capacitor used a National Type A vernier dial on which the range of zero to one hundred roughly corresponded to the first 100 kHz on 80 meters.

This rig was used regularly on 80 meters for about two years. Of course, once in a while someone would tell me to send my set back to Japan or wherever for repairs, but usually the slight chirp was only commented upon. The going really got rough when trees located too close to the vertical antenna were swaying in the wind; of course the cw note sways with the trees. Amusingly there have been a number of small pile-ups of folks who wanted to reminisce about their early Hartleys, etc. I am sure many of you have had this enjoyable experience when using an early design on the air.

Now to the main purpose of this article, which is to describe one person's experience in assembling a "circa 1922 MOPA." The original idea for the project came as the result of frequent browsing in the 1922 RCA catalog, "Radio Apparatus." This interesting volume seems to have been designed both to sell RCA products and to lure the radio amateurs of the day away from spark techniques and into the use of continuous wave operation. Of course that meant using tubes for transmission. The catalogue contained a number of suggested circuits keyed to the RCA components. Especially interesting to me was a short article by Harold Beverage in which he describes his own rig using a 204 in the output. Incidentally, this rig was one of those (along with 1BCG) heard by Paul Godley in Scotland during the 1921 transatlantic tests. Beverage was not the operator, as he was enroute to Brazil at the time. (It happened that Beverage shared the voyage across the Atlantic with Godley who was on his way to Scotland.)

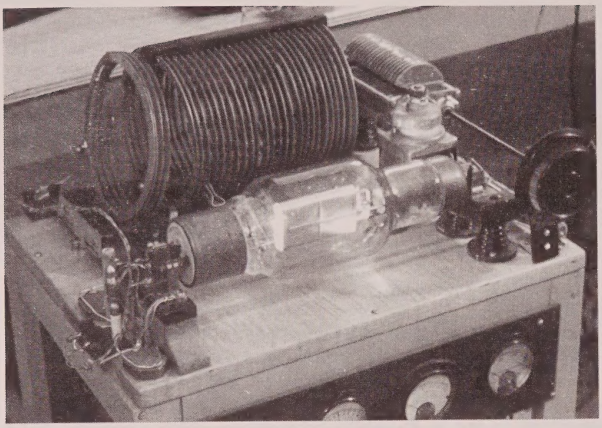
In the Beverage configuration the 204 output tube is driven by a single 202. It seemed to me that there was no way that a single 202 had enough power to drive a 204 to the power levels indicated. The implication, therefore, was that the un-neutralized 204 was somehow phase locked to the 202 "master oscillator," but itself was in an unstable (oscillating) mode. This looked like a fun project.

I began collecting parts to build such a rig. A combination of good friends and the Elgin/Rochester flea markets resulted in enough period components to begin. The real difficulty turned out to be finding a 204, or even a 204A, with sufficient emission to be useful. Clearly a good 204 would be something to treasure; perhaps the circuit was too scary from the viewpoint of preserving the 204 from the effects of spurious oscillations.

The next thought was to neutralize the 204 and then drive it with more power. Perhaps a pair of 202s could provide enough drive for a 204 which was operated with modest input power. Since the 204 would be the keyed stage, the 202s could be heavily coupled to the 204 to obtain maximum drive power. Still, maybe a 203 would be required to drive the 204. Due to this uncertainty it was decided to mount a 203 socket (just in case) along with the two 202 sockets for the oscillator stage.

This brings us back to the question of neutral-

The rig is built on a 3-tiered "rack" arrangement. The 204 is mounted horizontally on the upper board in front of the RCA "tank" coil. The plate RFC is mounted at the far right. The middle board houses the Hartley stage (parallel 202s) and, at extreme right, the filament transformer for the 204. The Hartley power supply is on the bottom board.



Close-up of the upper board shows construction details of the PA deck.

ization. Was neutralization of triode rf amplifiers used/contemplated back then? An interesting rig of the same era was the well-documented 1BCG transmitter used for the first transatlantic contact, and recently reproduced by Bob and Mike Raide. This transmitter used four 204s in a MOPA configuration, one served as oscillator and the other three for the output stage; there was no neutralization used.

I have not yet resolved the date when neutralization was first employed in the forms usually adopted in contemporary transmitter circuits. It appears that at least until 1923 neutralization of transmitter stages was not part of standard amateur practice. Since I was afraid of the risk to the relatively rare 204, I decided to use neutralization anyway.

To some extent, the rationalization for employing neutralization was provided by an article by R. A. Heising appearing in the August 1921 issue of *QST*. In that discussion Heising includes statements which made it clear that the origin of feedback instability in the parasitic grid-plate capacitance was well recognized at that time. In addition, Heising discusses means for feeding back a suitable signal from the plate circuit to the grid circuit such as to cancel the output signal due to the grid-plate coupling.

Unfortunately to my objective of wanting to use the article as a justification for the use of neutralization, he seemed to be trying to eliminate the feedthrough of the oscillator signal to the antenna more than to stabilize the output stage. (In hindsight, I can just pretend that is just what I was wanting to do!) Nevertheless it seemed to me that an astute person would see how to feedback the necessary signal by obtaining the 180 phase shift off the resonator inductance, and then using a capacitance analogous to the grid-plate value to feed back the canceling voltage.

Anyway this was the rationalization I employed to introduce neutralization using a tap off the output coil, which incidentally is the c.1921 RCA edge wound "oscillation transformer" in common use at the time. The RCA coil has more than enough turns for 160 meter operation, so only a fraction was employed for resonance on 80. The coupling to the antenna (I actually use an antenna tuner to minimize spurious output.) is implemented by a coupling loop. Again, this appears to be not how it was generally done at the time.

Usually the lead-in (viewed as part of the antenna) had a current null at the transmitter location and was tapped onto the PA coil, either directly or through a coupling capacitor. However there is an article in the April 1924 issue of *QST* by Maurice Goldberg extolling the virtues of what he calls "loose coupling" of a transmitter tank to the antenna. This appeared to me to be our more familiar and contemporary link coupling method. Thus a cast-off fragment of an RCA Oscillator Coil (two turns are selected by the taps for 80 meters), found at Dayton, was positioned so it could slide in a track to determine the degree of coupling with the main RCA coil forming the inductance of the 204 output tank.

Although filament bypass capacitors are not used in any of the circuit diagrams illustrated in the RCA catalog, and not in the IBCG rig either, their use was suggested by the editors of *QST* in their comments on the 8DE station belonging to Roland F. Palmer, as described in the September 1921 *QST*. As a result, such capacitors are included in the MOPA described here. The rf chokes used were homemade except for the one employed in the grid circuit of the 204, which "temporarily" is a commercial 2.5 mH coil in series with the grid leak resistor. Following the 1BCG circuit, both of these elements are in series with the key (and a milliamp meter indicating the 204 grid current.)

The keying is fine, and much safer than in the previous rigs described above. Of course the re-

(continued on page 44)

THE VACUUM TUBE

EDITED BY **BRO. PATRICK DOWD, F.S.C., W2GK**, 4415 POST RD., THE BRONX, NY 10471-3499
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Some Early American Valve Makers—Part 2 (Conclusion)

By Fin Stewart

Reprinted from H.R.S.A.* *Radio Waves* for July, 1997

Note: Part 1 of this article appeared in the November, 1999 OTB.

Conrad Shickerling was another valve manufacturer in the United States who had some unusual valves. The valve at left in illustration 7 is an S400. The Schickerling Products Company operated from a factory in Newark, New Jersey and made several valves which had unusual element structures. The earlier valves had a triangular plate and grid which were referred to as stabilizing elements and a patent was granted on this.

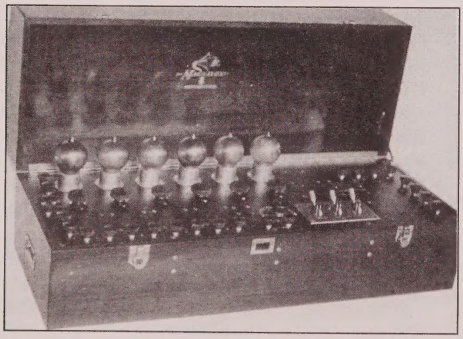
Reception with valves of this type was very poor. The elements looked like two Y-shaped strips of metal connected at the press inside the valve and placed on either side of the plate and grid. It has been rumoured that this assembly was also used on the later Schickerling UX201-A valves but no examples of this valve are known to exist which could confirm this.

Schickerling made several different valves in the early series, such as the S700, S8100 and a rectifier Z50. The S700 was a valve with a spherical bulb. Schickerling valves continued to be made for some years into the late twenties with conventional styles and type numbers such as SY227 etc.

The Emerson Multivalve type EM3VA was made by the Emerson Radval Corporation which had a factory in New York City. This valve is shown at right in illustration 7, and was written about in some of the early 1927 issues of *Radio News*. The valve was three triodes in one, with a common five-volt filament. The valves were actually made by the Cleartron Vacuum Tube Company, whose factory backed on to the Emerson building, being in the next street. Cleartron made standard valves, such as the CTX201-A etc., and also had a factory in England making valves with English bases.

Edwin S. Pridham and Peter L. Jensen founded the Magnavox Company in August 1917, following the merger of the Commercial Wireless Development Company with the Sonora Phonograph Distributing Company. This followed much developmental work on loudspeakers by Pridham and Jensen when working at the former company. They also did experimental work on public address systems.

The company began to be interested in making valves early in 1924 when one of the employees invented a valve which had the control element outside the path of the filament and plate current. A patent was applied for on this and granted to the inventor, Herbert Metcalf. The valve was not as efficient as the 201-A type and its commercial life was short. One of these is shown in illustration 8 on the left. The other valve in the illustration is a later Magnavox Universal Type 201-A. A type 171 was added to the line as a power am-



6. Magnavox 6-valve amplifier

*HISTORICAL RADIO SOCIETY OF AUSTRALIA

plifying valve but the economical life of these valves was cut short because of the failure of the valve plant to make valves which had a useful life.

Magnavox did make many items such as receivers and loudspeakers, and illustration 6 shows a six-valve amplifier unit made by the company and used by the *San Francisco Examiner* newspaper in 1926. The valves in this unit appear to be Western Electric types, probably 101Ds. One of the senior employees of the Australian arm of Magnavox lived in Hunters Hill near Sydney and had a pair of Magnavox R3 horn speakers on pillars in the lounge room. These were still there as recently as 1990.

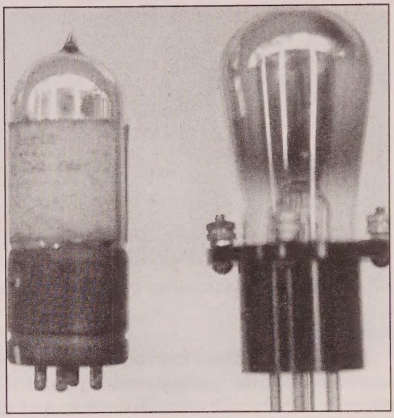
The Apco Manufacturing Company of Providence, Rhode Island made a twin valve. This contained two separate triodes but with one end of the filament tied together. The other ends of the filament came out at a point on the base where there was a switching assembly.

In use, when one filament burned out, the other could be activated. Or the two filaments could be operated together, with the valve thus operating as a high power amplifier. The AP Two-in-One valve was very similar and two versions of this are shown in illustration 9.

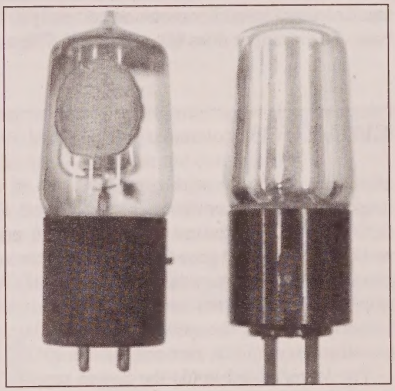
Early in 1920 another valve was made in America and is not mentioned in Tyne's book. This was the Pingen Detector Tube. A very unconventional type, the valve had a standard Edison screw base, the centre contact of which was apparently the grid connection, with the brass shell being the plate connection. The bulb was tubular, one and a quarter inches in diameter and about four inches long. The filament connection was made by way of an automotive-sized bayonet base at the top end of the valve. A few of these are in American collections today.

Another unusual American valve made in the late twenties was called the Quadratron. The control element of this valve was a triangle of sheet metal of the same shape as the filament but placed within the plane of the filament itself. The connection to this extra element was made by a terminal on the side of the base. The valve was invented by H.K.Huppert of the Baker-Smith Company of San Francisco. It does not appear to have been advertised anywhere but in the July 1926 issue of *Radio News*, where there is an article on the valve and its use in Neutrodyne circuits.

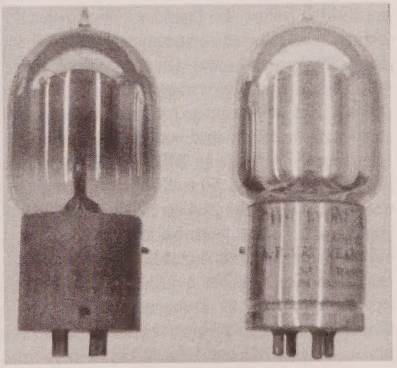
The July 1932 issue of *Radio* carried an article on a small cathedral-type radio using six unusual small valves. These were tubular with a small five-pin base in the same pin configuration as the UY227 or 807 valves, but were less than one inch in diameter. The set was made only in New Jersey and the valves may have been made by the Radio Products Company of Newark. The radios and valves are extremely rare and would not have found their way to



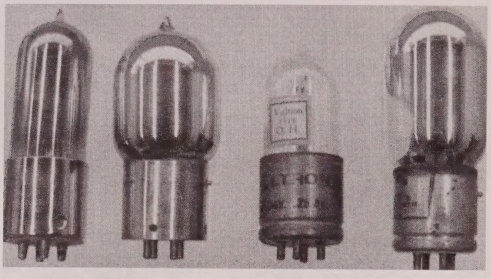
7. Left: Schickerling S400; Right: Emerson EM3VA multi-valve



8. Magnavox valves—left: Type A; right: Universal Type 201A



9. AP two-in-one valves - two versions



10. Various American valves of the early twenties.

Australia.

Illustration 10 shows four more unusual American valves of the early twenties period. The valve at left is a Crosley Deflectron and was made by the Crosley Vacuum Products Corporation, but no other information is available to me on it. From what can be seen of the element structure, it appears to be similar to a UV199, with a small element assembly mounted vertically to the base. The wrapper does not say much. The next valve in the illustration has a genuine Shaw base but no markings. The next valve is a Voltron OH and is similar to the Radiotron type WD12 made by Westinghouse. The fourth valve is a Volutron type A and is probably a 201-A type.

From the foregoing it can be seen that the American valve industry was full of entrepreneurs who, in many cases, were out to make money on valve devices, many of which would not perform satisfactorily, if at all. Tyne lists, on pages 351 to 365, many of these manufacturers and distributors with years and other information on the valves and some of the advertisements in which they appeared. Of course, many of these manufacturers were legitimate and licensed by RCA to make valves. Some were not. In this regard, many of the valves carried the type numbers devised by RCA, such as UX201-A, UY224, UY227 etc. The UX201-A was by far the most common general purpose triode ever made in the United States.

EVOLUTION, *continued from page 41*

ally big advantage with the MOPA is in no longer caring whether the trees sway or not! The figure shows the transmitter, built on an open wood frame painted grey (After WWI there was presumably lots of surplus navy grey paint!) The amplifier is on the top board, with the Hartley below (along with the ACME 150 Watt filament transformer and RCA rheostat for the 204).

The lower board holds the power supply for the Hartley. All components for this power supply are period except for two 20 mfd filter capacitors which are wired in parallel with the period 1 mfd Western Electric filter capacitors, but are hidden below the board. (The additional filtering is included in an attempt to reduce the random break-ins on the air suggesting there is something terribly wrong with my transistor radio.) The HV supply for the 204 is a utility supply in the shack, and is not part of the project. Limiting the voltage to 1000 to 1200, the resulting output power is 50 to 80 watts depending on the condition of the 204 or 204A in use.

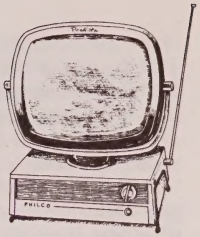
Actually, if the truth be told, the only tube I currently have that is capable of this output level is a 204A; the lone 204 available is emission limited and is lucky to squeeze out 30 watts. The two 202s can easily drive the 204A to 40 or 50 watts output. These tubes, especially in the tipped version I am using, are fairly rare. For "everyday" operation the 202s can be replaced by 210s. The 210s have the same filament voltage and a very similar value of plate resistance. The use of 210s pushes the date to about 1925, and the power level to over 80 watts output.

The choice of rectifiers was another problem. I do not have the 216s described in the RCA catalog for use with the transformer shown. (The 216 was basically a 202 with the grid missing.) For now, I am using the 281 tubes shown in the figure. The 281 did not appear until the end of the 1920s. Perhaps there are 216s or a spherical 204 out there? I would at least like to have a picture with a spherical 204 installed on the rig. While we are at it, finding another (cylindrical) 204 with decent emission wold be very nice; these are hard to find.

To conclude, I would love to hear from anyone who can improve my understanding of what transpired in 1921, someone having built a similar rig, or whatever. This was an extremely satisfying project, and has resulted in a reasonably practical transmitter. Hopefully I will run into some of you one of these days on 80. Although he was pretty demanding, I am reasonably confident that the project would have had the Glenn Rogers seal of approval. He would have criticized the T8 tone however (not ac hum); oh well, nobody is perfect!

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



Trouble in Television—Part 2

By Alva Johnson

Adapted, with permission, from *The Saturday Evening Post* for September 28, 1940.

Note: Part 1 of this article appeared in the November, 1999 *OTB* .

Few of us experienced the earliest days of pre-war electronic television. Unlike radio, television was available to only a very small number of people in the years just before WWII since the transmissions covered a limited range and networks were not yet in operation. Shows all originated locally, but the impact of television was felt around the country as folks clamored for the chance to "look in." My columns for the previous issue and this one provide an insight into those days, almost 60 years ago, when politics almost derailed the beginnings of television in the United States. My occasional comments are set off in brackets.—RB

Guardians of the Poor Man's Pocketbook

The argument of chairman Fly and some of his fellow members of the Federal Communications Commission, which controls television, is that none but well-to-do people should participate in the excitement of television, because a genius may come along someday with a new and improved system of television which will outmode the current sets.

Elegantly dressed 1940s viewers tune in an RCA TRK12 "mirror in the lid" set.

[In fact, the following year, 1941, new standards were set, which increased the number of lines from 441 to 525 and added FM sound. Neither of these developments rendered the older sets useless. In most cases the set worked quite well: the horizontal oscillator usually had enough range to handle the higher frequency and the AM detector was able to decode the FM signal by "slope detection" A bigger problem was the addition of additional channels 7 through 13. Some pre war sets then had newer tuners installed, to the dismay of many collectors today!]

No new genius has arrived on the horizon of television, however. There is nothing, except some possible eccentricity on the part of the commission itself, which threatens to destroy the usefulness of existing sets for years.

[Some years later, RCA went to great lengths to develop a "compatible" color television even as the FCC approved (temporarily) the non-comparable CBS system!]

Nearly everybody agrees that geniuses will arise, and that at some day in the future the public will pay $39.75 [!] for a set which will combine color, three

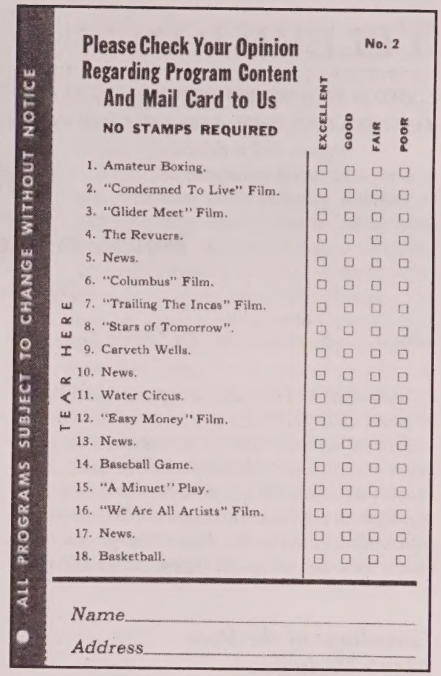
dimensions and better detail than the movies. That day may be ten or twenty years hence. But according to Chairman Fly, "a couple of generations in scientific development is not long."

In the course of the television controversy, somebody pointed out that there is such a thing as "obsolescence of time." The Dutchers, for example, bought their television set chiefly for the benefit of Mrs. Dutcher's father, who is seventy-nine years old and in feeble health. In spite of failing eyes, television, he says, is the greatest enjoyment of his life and brings him glimpses of an unknown world. The thrill of being a pioneer in television is one of the points overlooked by the Federal politicians; possibly because they have lived so long in what Senator Lundeen called "the smug atmosphere of Washington." Early pioneers in radio say there was no thrill equal to that of catching the first "cat's whisker" of sound over the old crystal sets: a set which they never would have owned if the bureaucrats of twenty years ago had formed the habit of safeguarding the common people against new inventions.

The first year of public television in America has been one of remarkable scientific advance, in spite of stubborn political obstruction. A year ago, national television networks seemed impossible because the television-carrying cables cost $5000 a mile. Today, national networks at moderate cost are assured through the development of short wave relay stations for television *[microwave links]*. It was considered impossible a year ago to send television over telephone wires; today it is being done regularly *[coax cable]*. Portable television cameras for outdoor use have been made lighter and cheaper.

The television camera is already more efficient than the motion-picture camera in some respects. There were repeated uproars at the Republican Convention at Philadelphia because of the blinding lights required by motion picture photographers, but the television cameras worked satisfactorily when the lights were comparatively dim. The Don Lee station of Los Angeles, which has been broadcasting television experimentally for ten years, succeeded in televising the Pasadena Rose Parade, on January 1, 1940, in a rainstorm.

One highly suggestive application of the new art by the Don Lee station was that of transmitting the thumb prints of a criminal to the 400 or 500 television sets in the Los Angeles area; from these wireless motion pictures, seven sheriffs were able to identify the criminal immediately. The television art is so far advanced that, according to the testimony of a Don Lee representative, a chain of theaters on the Pacific Coast has offered to pay $18,000 a week for a regular television service on motion picture screens in its theaters.



Please Check Your Opinion Regarding Program Content And Mail Card to Us

NO STAMPS REQUIRED

No. 2

ALL PROGRAMS SUBJECT TO CHANGE WITHOUT NOTICE

TEAR HERE

	EXCELLENT	GOOD	FAIR	POOR
1. Amateur Boxing.	☐	☐	☐	☐
2. "Condemned To Live" Film.	☐	☐	☐	☐
3. "Glider Meet" Film.	☐	☐	☐	☐
4. The Revuers.	☐	☐	☐	☐
5. News.	☐	☐	☐	☐
6. "Columbus" Film.	☐	☐	☐	☐
7. "Trailing The Incas" Film.	☐	☐	☐	☐
8. "Stars of Tomorrow".	☐	☐	☐	☐
9. Carveth Wells.	☐	☐	☐	☐
10. News.	☐	☐	☐	☐
11. Water Circus.	☐	☐	☐	☐
12. "Easy Money" Film.	☐	☐	☐	☐
13. News.	☐	☐	☐	☐
14. Baseball Game.	☐	☐	☐	☐
15. "A Minuet" Play.	☐	☐	☐	☐
16. "We Are All Artists" Film.	☐	☐	☐	☐
17. News.	☐	☐	☐	☐
18. Basketball.	☐	☐	☐	☐

*Name*_____

*Address*_____

Survey attached to WNBT (NBC) program guide solicited viewer's opinions for the 18 offerings aired July 7th—July 12th, 1941.

The television camera still has faults. It "sees" infrared rays, which the eye does not. Its sensitivity to "invisible light" causes some odd effects. Red, for example, appears as grey in black-and-white movies or in ordinary photographs, but it is nearly white in television. Because green leaves reflect infrared rays, a tree may appear to be snow colored in midsummer in television. A blond is a "blizzard head" in the dictionary of television, because her hair appears in television as a glittering storm of sparks; a brunette is a "dark angel" because her coloring is perfect for television; a redhead is a "problem child" because it is impossible to tell in advance just how she will look when she is put on the air. Television has a way of probing below the surface; it will sometimes disregard dyes and picture a head of hair in its natural color. It photographs unsprouted whiskers as well as sprouted ones. An actor, gifted by nature with an indigo beard, may be barbered ten times over, but he will still appear to the television camera as a shaggy blue tramp, unless he buries his face in make-up.

Some television cameras can't be used on beaches because they render certain kinds of bathing suits invisible.

Halting a New Industry

Wrestling is not the sole support of television. One of the most successful features has been the television drama, with flesh-and-blood actors, sometimes supported by film sequences. A fifty minute tabloid version of *Jane Eyre* achieved the highest popularity. The television public gives regular ratings of *Poor, Fair* and *Excellent* to NBC programs. These are sent on post cards to television headquarters, where they are used as a basis of discovering public taste. Other flesh-and-blood television dramas broadcast from the NBC studios included *Little Women, Treasure Island, Ethan Frome, Pinafore, The Pirates of Penzance* and William Saroyan's *My Heart's in the Highlands*. Some of these were received with enthusiasm by theatrical men. One of the popular television numbers in Los Angeles has been the televising of rehearsals of motion picture scenes at the RKO studio in Hollywood.

Outdoor sports usually received high ratings. Larry MacPhail allowed the opening game of the Dodgers to be televised free of charge as a contribution to science. Mike Jacobs has allowed several fight shows at Madison Square Garden to go on the air by television, because he foresees the day when the big battles will all be television shows. His theory is that there will be a studio audience of 1000 at $100 a ticket at a championship bout, while television audiences in homes and theaters throughout the country run into the millions, and advertisers bid vast sums for the privilege of being the sponsor. The wrestling industry has been delighted at the increase in its prestige resulting from getting into good homes via television. According to many accounts, refined women [!] are the wildest enthusiasts over the television presentation of the struggles of the trumpeting pachyderms. I. T. Flatto, manager of the Ridgewood Grove Athletic Club, permitted all his boxing and wrestling shows to be put on the air free of charge until the bureaucrat put a stop to it.

This particular attack on television was made by the New York Boxing Commission. Its chairman, J.J. Phelan, said that he did not see where there was "anything in it" for New York State. The FCC's attack on television started early this year. In February, the FCC authorized David Sarnoff, president of the Radio Corporation of America, to start a campaign to sell television sets. In March, the commission attacked Sarnoff for carrying out the authorized plan. In April, Chairman Fly testified before a Senate committee that the FCC had been wrong and that Sarnoff had been right. In the meantime, however, the public had been scared away from television. In the first week of his campaign, Sarnoff had sold 500 television sets; in the second week after the commission's attack, he sold only ten sets. A new industry was stopped in its tracks. According to Sarnoff, television should become a billion-dollar-a-year industry employing a million men. According to William H. Grimditch, an executive of Philco, television is so big that it will "dwarf radio almost into insignificance." Thousands of engineers, electricians, factory workers, salesmen, research men, actors, directors, musicians and others would have been put to work in television in the past six months, except for the FCC. As it is, hundreds lost their positions. Chairman Fly's explanation before the Senate committee was that the FCC had "misjudged the situation." Several of the seven members of the FCC have long records as business baiters. The transcript of the television hearings before the FCC makes it fairly clear that some of the commissioners are the kind of men who would rather have a controversy than an industry.

More than $20,000,000 has been spent in research in television in America. All modern television, both in America and in Europe, is based on the work of Farnsworth, Zworykin, Alexanderson and other American scientists. Politicians paid little attention to it during its period of struggle. Curiously enough, the onslaught on television is founded on the discovery that the law intended the FCC to act as a guardian angel or patron of television. The experience of television with the FCC is a vindication of Doctor Johnson's definition of a patron as "one who looks with unconcern on a man struggling for life in the water, and when he has reached the ground encumbers him with help."

The commission found its first opportunity for trouble after television had progressed to a stage where advertising agencies became interested in experimenting with it. As a result of the Newburgh experiment, the Radio Corporation had reported to the commission that a vigorous sales campaign might sell 25,000 or more sets in the New York area within a year; and that, with a television public of this size, advertising sponsors would be willing to invest money in pioneering and research in television programs. The FCC okayed the RCA plan, and on February twenty-ninth authorized "limited commercialization."

A Well-Advertised Surprise

The phrase "limited commercialization" is one indication of the FCC's state of mind. "Limited Commercialization" means that the advertising sponsor may pay the cost of the program, but nothing more. The purpose of this was to prevent the television industry from overcharging the advertisers. One commissioner expressed the fear that television would sell "blue sky" to the advertisers. Nearly everybody outside the FCC knows that the big advertising agencies are the wariest and canniest businessmen in the world.

When Sarnoff went ahead with his commission-approved plan, the commission swung into action. It charged him with aiming at monopoly, with attempting to "saturate the market," to get the jump on his competitors, to "freeze the standards," and to load the public with instruments which might soon become obsolete.

Had Sarnoff been a smaller man, there probably would not have been any trouble in television. A less important figure would not have been attractive as a target for an anti-big-business crusade. Twenty-four years ago, Sarnoff had an almost exact vision of the future of radio and built a great industry on it. Twelve years ago, he had an even more glittering vision of the future of the future of television and has played a leading part in laying the foundation for that industry. Thus he is made to order for the old fashioned business baiter.

Sarnoff's struggle to bring television into being in America is a strange chronicle. His company spent approximately $10,000,000 on television research. The first anti-Sarnoff campaign was started a few years ago, on the theory that Sarnoff was malingering; that he was deliberately holding back television because he feared that the new art would interfere with profits from the radio business. He was summoned to Washington by high authority and given to understand that America could not afford to have England, Germany, and other countries to lead it in television. From some influential quarters came demands for ownership of television, because of the alleged sabotage of television by Sarnoff and others. Finally, after getting television established by enormous effort and cost, Sarnoff found himself the ringleader of an equally vicious but totally different sort of conspiracy. He was conspiring, this time, not to keep television away from the people but to foist it on them.

Even after Chairman Fly had withdrawn his charges against Sarnoff before the Senate committee, the berating of the RCA chief continued. When newspapers and magazines criticized the FCC, Sarnoff was accused of "inspiring" them.

Soap-Box Scientists

Chairman Fly, as has been said, is an able man. The way he boned up on television was a surprise to the industry. Within a few months he was able to rattle off the nomenclature with the best of them. Had television been an ordinary branch of knowledge, he might have become a master of it. But television happens to be a combination of many sciences. It is divided into scores of specialties, and the specialist is lucky if he has a complete grasp of his own specialty. It is a field in which a little learning is a particularly dangerous thing. The late Sir Joseph Dudeen put the matter a little more bluntly when he said, "No amateur knows anything." The worst fault of the bright amateur in any line is the tendency to use figures of speech as a substitute for knowledge. Chairman Fly has developed a small dictionary of metaphors, such as the "lock-and-key" situation, "the standard-gauge track" and "freezing the standards." They represent an honest effort to translate scientific and engineering complexities into the language of stump oratory. The trouble is that they become slogans and battle cries. They are useful in political-shouting affrays, but not in constructive deliberation. The "lock-and-key" metaphor, as far as it means anything, indicates that the television transmitting set is the "lock" and the receiving set is the "key"; and that, if the "lock" is ever changed, the "key" becomes useless. The figure of speech evaporates, however, because the television tube *[receiver]* is a versatile instrument which can be adjusted to any practical type of television now in existence or promising to come into existence. Marshall P. Wilder, a television engineer, correctly explained to the commission that the receiving set is "an extremely flexible skeleton key, capable of fitting a wide variety of locks." "Freezing the standards" is supposed to mean the prevention of future improvement. The FCC stoutly maintains that the sale of 25,000 television sets will "freeze the standards" of television, even though the sale of 44,000,000 radio sets has not prevented improvements such as Frequency Modulation in radio.

One of the difficulties in television today is that in Washington it has become a sort of soap-box science. Politicians are trying to talk like scientists, and scientists in turn are compelled to talk like politicians. Nothing beclouds the future of television more than a few flowers of rhetoric.

AWA Review Volume 12 Now Available

The Atwater Kent Radios

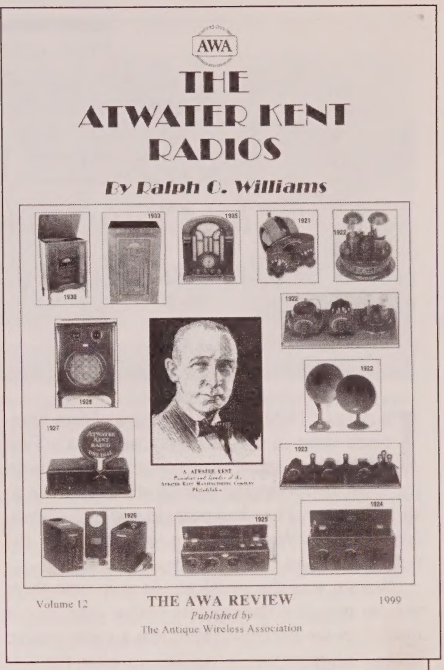
By Ralph O. Williams

One of the giants of American industry, by any standard, was Arthur Atwater Kent, who, in the brief span of fourteen years, designed, manufactured, marketed and sold some five million radios. While Kent became exceedingly wealthy in the process, he in turn bequeathed to us a legacy of a myriad of unique, high quality products. These products of his energy and invention are the topic of *The AWA Review*, Volume 12.

The author, Ralph Williams of Orient, NY, has spent a large part of his adult life studying Atwater Kent, his methods, and his radios, and is widely recognized as the world expert on the subject. Since his retirement, he has founded a private museum, one of the most complete in the world, devoted to the man and his radios. The results of this dedication have also appeared through the years in various writings, including a series in *The AWA Review*, Volumes 1, 2, 3, and 10 in 1996. Other journals, such as *Radio Age*, have also published his material, which has proven to be very popular. Unfortunately, with the possible exception of the 1996 material, these publications are all now out of print and must be obtained through private sources.

The sheer quantity of material in Volume 12 of *The AWA Review* has necessitated a much larger publication than usual. To assemble the details and present them in a coherent and progressive manner has been a monumental job on the part of the author, and the book has been several years in preparation.

This book is *not* simply a reprint of prior writings, but is a complete new work, covering the entire range from the first of the radio laboratory instruments to the later superhets. Details not previously printed are included. The book boasts over 100 pictures. Our author has also commented on the changing face of the radio art and the socioeconomic climate of the 1920s and 1930s, which provided the challenges so important to the success of Atwater Kent. This background of the era is valuable to any student of the time and collector of the artifacts, and is not necessarily limited to those interested in Atwater Kent. There are three appendices, including a section on refinishing and restoring breadboards, an index of all models, and a separate insert detailing the radios and their characteristics.



The beginning collector will find here a wealth of subject material to work with. The more experienced collector will find information that can help clear the confusion regarding details of the various sets as they were developed. This book is also presented to help focus attention on this remarkable man and his contributions, and perhaps stimulate all collectors to new efforts.

The AWA Review, Volume 12, 1999. "The Atwater Kent Radios," by Ralph O. Williams. Size: 6 by 9 inches; 320 pages, soft cover; illustrated. Price: $29.95 postpaid in the US and Canada; $35.00 US funds elsewhere. Order from Edward M. Gable, 187 Lighthouse Road, Hilton, NY, 14468.

PAUL JOSEPH BOURBIN

GENESIS REVISITED:
The Commemoration of the First Wireless Message on the West Coast

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In August 1899, the City Fathers of San Francisco were in a quandary. California's First Volunteer Regiment of soldiers were returning from the Philippine Islands aboard the troopship *Sherman*. They had participated in the Spanish American War and were to be feted by the residents of San Francisco upon their arrival.

Therein was the problem. At that time there was no way to communicate with a ship once it went over the horizon. There was a cable station in the Philippines, so it was known when the ship left, but when it would arrive in The City was anybody's guess. The residents could not just wait around for the ship to arrive; making the *Sherman* wait in the Bay until City got its celebration together would be absurd.

A lookout could be placed in a strategic location to report the ship's arrival. The Cliff House had a good view of the bay and a telephone line to downtown but, more often than not, in August, the area around the Golden Gate is enshrouded in fog.

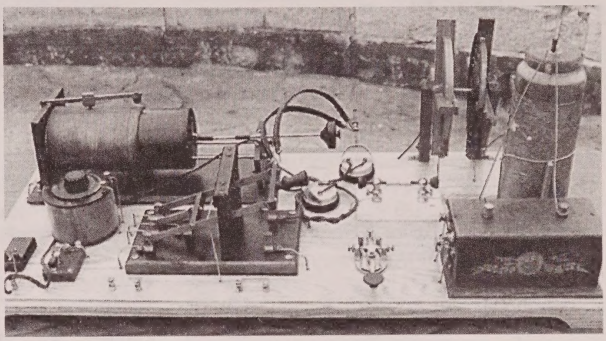
So traditional methods could not be relied on. The ship might not be seen until she reached the Golden Gate, which would not permit enough time for preparation, and the celebration would be spoiled. What could they do to have a reliable

Reenactment participants gather outside Cliff House as the event gets underway.

AUTHOR'S ADDRESS: 25 GREENVIEW COURT, SAN FRANCISCO, CA 94131

method to spot the ship and gain enough time to get the celebration underway when the ship landed?

It was known that the *Sherman* would have to pass by the lightship *San Francisco*, located nine miles outside the Golden Gate, before reaching the city. If word could be sent from the lightship, there would be ample time to prepare the celebration.



Paul Bourbin's reconstructed 15-watt spark transmitting and receiving station was put together from vintage components.

George Otis Mitchell, a physics teacher at Girl's High School, had experimented with wireless telegraphy. He had the idea that if a wireless transmitter were put on board the *San Francisco*, a lookout could report sighting of the *Sherman*. A receiver located in San Francisco would then pick up the message, which could be relayed via telephone lines.

A group of men got together to accomplish this task. The newspaper *San Francisco Call*, seeking a scoop, sponsored the venture.

The first test transmissions, using a Tesla Coil, were sent from the Spreckles Building in downtown San Francisco and received at Telegraph Hill. Results were mixed due to interference from trolley cars. Later, the receiver was moved to the Cliff House overlooking the Pacific Ocean. This location was away from trolley cars and closer to the lightship.

A Ruhmkorff coil spark transmitter was installed on the *San Francisco*, and the wait began. On 23 August, at about 5:00 P.M., the Sherman was sighted through the fog, and Charles Fisher tapped out, "*SHERMAN* IS SIGHTED." He had only the spark transmitter and had no way of knowing if the message was received.

Fortunately, it was. The coherer, connected to a 75-foot vertical wire with a "capacity hat", detected the signals and the Morse inker noted them. A telephone call was made from the Cliff House to the *San Francisco Call* with the happy news. A cannon was fired from atop the Spreckles Building, followed by other signals. The City welcomed the *Sherman* and her heroes and celebrated for three days (they really knew how to throw a party!).

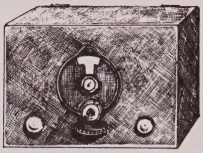
On Saturday morning, August 28, 1999, a group of about fifty radio historians gathered at Cliff House. Also present were an Historian and a Naturalist from the National Park Service, the press and a few bemused tourists. They were commemorating the 100th anniversary of the first working wireless signals in America. The California Historical Radio Society, the Perham Foundation, the San Francisco Amateur Radio Club, the Golden Gate National Recreation Area (owners of *Cliff House*) and the United States Coast Guard sponsored the ceremony.

As it happens, three separate wireless transmission events occurred in the United States about the same time in 1899. But the evidence suggests that the signal of August 23, 1899, sent from the *San Francisco* was, indeed, the first wireless transmission in the United States, or, perhaps, in the Western Hemisphere.

The commemoration was not quite as spectacular as the 1899 celebration, but the magic was still there. While the event did not start until 10:00 A. M., members of the various groups were busy setting up all the myriad of things necessary for the event. There were the exhibits of early equipment, a VCR and TV to play the commemorative documentary produced by CHRS President Steve Kushman and aired on KGO-TV, the modern radio transmitter and receiver to be used for the reenactment, public address equipment etc.

At the appointed hour, Steve Kushman welcomed one and all and outlined the significance of the day and the events to occur. Don Koijane, President of the Perham Foundation, explained the need for historical preservation and the Foundation's plans for an electronics museum.

(continued on page 54)



AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.

Results of the Bruce Kelley Memorial 1929 QSO Party

The annual Bruce Kelley Memorial 1929 QSO Party was held during the first and second week-ends of December 1999. Conditions over the first week-end were generally good. The second week-end had variable weather conditions in different parts of the country ranging from thunderstorms in the south to high winds in the northeast. Hank, W6DJX, reported very poor conditions on the west coast on the second Saturday evening. In spite of that a lot of contacts were made. No RTTY QRM on either week-end was experienced in our operating segment of the band.

In addition to our regular players, we had a number of enthusiastic newcomers to the '29 test. Welcome. Looking through the returned logs it is apparent that a number of hams have built the Hartley oscillator using the type 27 tube as described in an article by Bob Raide, W2ZM — "An Inexpensive Way to Build a 1929 Transmitter" (August, 1998 *OTB*). Thanks Bob.

Bob Raide once again garnered the most QSOs with 75. Dave, VE3BBN, was nipping at Bob's heels in second place with 69 contacts, and newcomer to the Party, Scott, WA3FFC, was close behind with 68 QSOs.

As of this writing, December 30, only 60 logs have been turned in. It is estimated that some 20-25 logs have not yet been received. I have an editor's deadline to keep with Marc Ellis.

Once again many thanks for your notes and comments, and also for the pictures of the rigs. We have some real craftsmen in our group. Hope to see you all on the Linc Cundall OT DX test in April.

The Top Ten Scores

Call	Contacts	Call	Contacts
W2ZM	75	N9AHQ	52
VE3BBN	69	K3DZ	46
WA3FFC	68	W2AO	41
W5WS/3	55	W9QZ	35
KJ8L	54	W1TSP	33

Complete Participant List

Station	Contacts	TX	PWR	RX
W1GIG	10	PP TPTG 45s	10W	SP-600
W1TSP	33	Hartley 45	7W	—
K1GDH	2	TNT	5W	SX-28
W1DDW	29	Hartley 210	10W	—
KA1CFQ	12	Hartley	10W	—
W1YT	22	TNT 10	5W	—
W1YG	25	PP TPTG 210s	10W	—
W1NN	6	Hartley 45	—	3 tube TRF
W1FPZ	20	PP TPTG 210s	10W	—
KE2O	24	28 TPTG	7W	—
N2CDD	17	Hartley 27	5W	—
N2VO	26	Hartley 45	5W	RCA AR88
KB2PLW	12	TNT 27	5W	—
AA2CU	28	Hartley 45	9W	HQ 170A
W2LDM	14	MOPA	10W	HRO
N2TWW	19	TNT 01A	4W	—
W2KFG	32	TPTG	10W	—
W2AO	41	Hartley 210	5W	HQ120
N2YR	10	Hartley	9.2W	—
W2ER	25	PP TPTG 210s	10W	—
W2YIK	22	Hartley 6W	HRO	—
W2AN	24	TNT 10	10W	—
K2KK	10	MOPA	2W	—
W2ZM	75	Hartley	8W	—
W2HBE	31	Hartley	10W	REGEN
WA2NPL	23	PP TPTG 211s	10W	—
N2EZ	17	TPTG	10W	HQ120
W3VVS	20	Hartley 210	5W	—
W3FJJ	15	Hartley 45	10W	—
WA3FFC	68	28 MOPA 10s	10W	—
KD3OR	21	Hartley 510	10W	—
W3DB	24	Hartley 211	10W	—
W3OER	16	TNT 201A	1.5W	Pilot Wasp
W5WS/3	55	MOPA 210,210	10W	—
K3DZ	46	MOPA 27,10	8W	—
KA3P	22	Hartley	10W	—
K4LJH	28	Hartley 211	10W	—
AA4RM	16	PP Hartley	10W	FB-7
K4KRE	3	Hartley 245	10W	—
W4LN	13	Hartley 10	9W	—
K5RB	10	Hartley MOPA	—	SW-3
K5CF	1	TNT 10	8W	—
W6TDP	9	Hartley	10W	—
K6NL	5	Hartley 210	10W	—
Station	**Contacts**	**TX**	**PWR**	**RX**
W6DJX	14	TNT 10	10W	HRO
K6TQ	3	TNT 10	10W	HRO
W7LNG	12	TNT 10	10W	—
W7LOG	3	TNT 45	9W	HQ-120
W7QQQ	21	TPTG PR 27s	10W	—
K8JWR	26	MOPA 27,27	10W	REGEN
W8KGI	12	Hartley	10W	—

NI8G	17	TPTG	6W	—
KJ8L	54	MOPA	10W	—
AA9DH	15	Hartley	5W	—
N9AHQ	52	MOPA	8W	—
W9QZ	35	Hartley 27	1W	—
VE3DKW	31	Hartley 45	10W	HRO
VE3BHW	32	Hartley 45	5W	—
VE3BBN	69	PP TPTG	5W	—

The Linc Cundall Memorial OT DX Contest

A MEMORIAL TO LINC CUNDALL W2LC

The annual OT DX Contest will take place in April, 2000. This contest, held on 40 and 20 meters gives the West Coast and DX Old Time operators a chance to compete on even terms. As of this writing, there are no contests scheduled for the dates posted below. To make the contest more attractive to a greater number of members, a major rule change will be instituted this year as follows: In general, the traditional AWA cutoff year between Old Time and Modern equipment has been 1942. This year for the OT DX contest, the cutoff will be 1960. Equipment and circuits manufactured or designed before 1960 will be counted as OT gear in scoring. This encourages the building of many excellent circuits that are to be found in the 1950s handbooks and periodicals. Also, to address the complaint that it was difficult to "find" each other on 20 meters during the 1999 contest, the frequency window has been narrowed.

If you don't receive an OT DX Contest Log by April 1st, 2000, please write to Randy Haus KB2PLW, P.O. Box 665, 303 Pennsylvania Avenue, Trumansburg, NY 14886. Parker Heinemann, W1YG, has computerized the mailing list and your address will be forwarded to him.

• *Dates and Times:* 2200UTC Wednesday to 2200UTC Thursday (April 12-13) and 2200UTC Saturday to 2200UTC Sunday (April 15-16).

• *Objective:* Contact the greatest number of AWA members. When calling, use "AWA AWA AWA de KB2PLW," as an example. Once contact is made, exchange year of equipment such as "TX 55" for a 1955 transmitter and "RX 38" for a 1938 receiver. Send "MOD" for 1960 or later gear.

• *Rules:* A station will be scored only once on each band. Non-member contacts and stations not submitting logs will not count.

• *Frequencies:* 7030-7050 kHz and 14050-14075 kHz, +/- QRM.

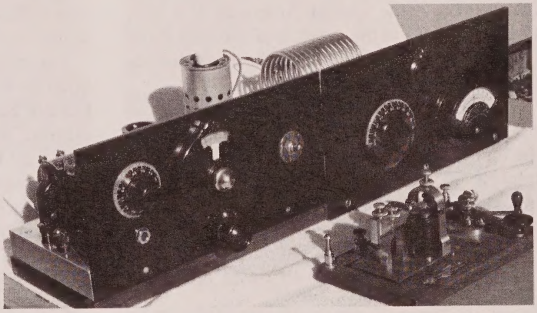
• *Scoring:* QSO Zones: "E" eastern zone, US Districts 1, 2, 3, 4, 8, 9, plus VE1, VE2, VE3; "W" western zone, US Districts 5, 6, 7, 0 plus VE4, VE5, VE6 & VE7; "DX" zone, all others.

• *QSO points per contact by zone:* "E" to "E" or "W" to "W": 1 point; "E" to "W" or "W" to "E": 2 points; "E," "W," or "DX" to "DX": 3 points

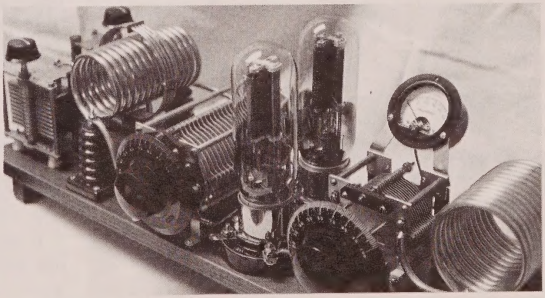
• *Equipment Multipliers:* Mod TX and RX: 1 point; OT TX or RX: 2 points; OT TX and RX: 3 points

• *Power multipliers (input to final):* 0-4.9 watts: 4 points; 5-24.9 watts: 3 points; 25 - 100 watts: 2 points; 100+ watts 1 point

• *Determining total points per QSO:* (1) Find the QSO points for the contact. (2) QSO points × your equipment multiplier × your power multi-



Beautiful "1929" station built by Rick Weber, W9QZ, and posed behind a very nice key and sounder set. Hartley transmitter on the right, regenerative receiver on the left.



Very impressive "1929" push-pull tuned grid-tuned plate transmitter built by Stan Hojnacki, WA2NPL. It operates at 10 watts input (200 volts at 50 mA on the plates).

plier = total points for the contact.

• Scoring examples: **Example 1**, W3VVS contacts W1FPZ. (a) both are in the "E" zone for 1 QSO point; (b) both have OT TX and RX for a 3 multiplier; (c) both are operating at 10 watts for a 3 multiplier. Therefore, the contact is worth $1 \times 3 \times 3 = 9$ points for each operator. **Example 2**, K6TQ contacts W2ER; (a) "W" to "E" contact for 2 QSO points; (b) K6TQ has OT RX and OT TX with 20 watts; (c) W2ER has MOD RX and OT TX running 50 watts. therefore the contact is worth $2 \times 3 \times 3 = 18$ points for K6TQ and $2 \times 2 \times 2 = 8$ points for W2ER.

• *Awards:* Plaques will be given out at the AWA Conference in September.

• *Logs:* Log sheets will be sent out to previous OT contest participants. Assuming that the list may have some omissions (or if you are a first time OT contest entrant), please write to me if you do not receive a log sheet by April 1st, 2000. Send logs by June 1st to Randy Haus KB2PLW at the address listed above.

GENESIS REVISITED *continued from page 51*

Richard Everett, Curator of the San Francisco National Maritime Museum, spoke about its new radio wing.

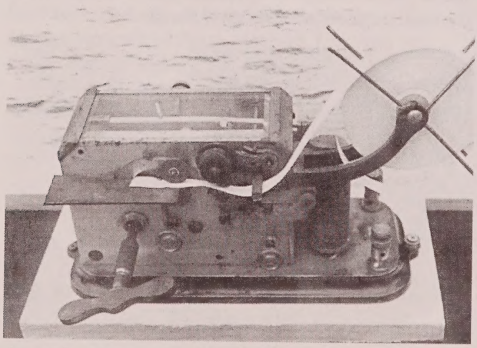
Steve Haller, of the GGNRA, gave a talk about the Presidio and its wars. Bob Holloway, also of the GGNRA, talked about the Cliff House site, its fog and environs. Col. Earnest James gave listeners background information about the First California Volunteers Regiment's involvement in the Spanish American War. Bart Lee, impresario of the event, told listeners about the technology of that time and the event that occurred 100 years ago.

Captain Charles Williams spoke on behalf of the Coast Guard, whose predecessors operated the lightship. Paul Bourbin explained how spark transmitters work while the President of the San Francisco Amateur Radio Club, Alan Schuman demonstrated Paul's reconstructed 15-watt spark transmitting and receiving station. Spark signals from the rig were received on at least one portable transistor radio.

Then came time for the reenactment. From a Coast Guard cutter, located just beyond Seal Rocks, under the command of Lt. Mike Fazio, came the Morse Code transmission, "*Sherman* is sighted." The transmission was picked up by a Coast Guard receiving station set up by C.W.O John Kedge and relayed through the P. A. system. It could be heard loud and clear.

The group was then invited to watch the documentary video and ask questions. Upon conclusion of the event, participants enjoyed a fine meal in the elegant dining room of the Cliff House.

On exhibit for the event was a coherer supplied by Will Jensby, a Morse inker supplied by Curator Ed Gable of the Antique Wireless Association, and a commemorative illustration, drawn by Kent Leech. The S. F. Maritime Museum amateur radio station, K6KPH, manned by Tom Horsfall and Dick Dillman, copied the commemorative message and responded with a QST QSL message on the 80 meter ham band. The AWA station in upstate New York also copied the message transmitted by the Coast Guard cutter, and responded. The event was reported on several news programs, including San Francisco TV station KRON, and in the newspaper, San Francisco Examiner.

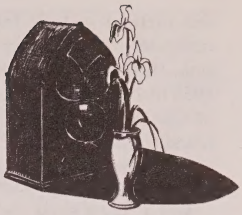


An early Morse inker loaned by the Antique Wireless Association was among the artifacts exhibited at the event.

It has been said that "Necessity is the Mother of Invention." Never has this more been the case as on that day in 1899 when a problem existed for which there was no common solution. Little could any of the participants know of the giant industry that would grow from the experimental technology pressed into service to avoid being late with a party!

It was a very pleasant event. Now everyone looks forward a few years in the future, when we will commemorate the early modulated-spark, voice transmissions (the first radiotelephone), made by the McCarty brothers in 1902 from the same location.

RECENT RADIO, TV AND ENTERTAINER OBITUARIES



COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

HOYT AXTON, 61, (10-26-99) Folksy singer, songwriter and character actor. A sampling of his singing hits includes *Boney Fingers, When the Morning Comes and Joy to the World.* Performers who sang other songs he wrote included Ringo Starr, Steppenwolf, Elvis Presley, Joan Baez, Waylon Jennings, John Denver and Linda Ronstadt. Some of his TV acting credits include *Bonanza*, *McCloud*, and *WKRP in Cincinnati*. Axton appeared in such films as *The Black Stallion* (1979), *Gremlins* (1984) and *We're No Angels* (1989).

CHARLIE L. BYRD, 74, (12-2-99) jazz guitarist. The classically trained guitarist's career spanned nearly 50 years and helped popularize bossa nova to American audiences. Byrd recorded over 100 albums and his 1962 recording of *Jazz Samba* with saxophonist Stan Getz and bassist Keter Betts sold a million copies. He began his career playing for high school dances and later worked with Sol Yaged (1947), Joe Marsala, Barbara Carroll (1948) and Freddie Slack (1949). Byrd was a regular on Mutual's *Bandstand USA*, played for concerts and club dates and made several international tours.

MARTIN DAVIS, 72 (10-4-99) Former Chairman of Paramount Communications. He began his career in 1947 as an office boy at the New York City headquarters of Samuel Goldwyn Productions. In 1958 Davis joined Gulf + Western, which owned Paramount, and in 1983 he assumed control of the firm from its founder and Chairman Charles Bluhdorn. He restructured the firm by selling assets and leaving it with a core group of media and entertainment holdings. The firm's name was changed to Paramount in 1989 and was subsequently sold to Viacom in 1994.

FRANK DEVOL, 88, (10-27-99) composer. He wrote over 50 film scores and theme music for such television programs as the original *Brady Bunch* and *My Three Sons*. He began his music career in 1925 playing the violin with a theater orchestra and later toured with the Alvino Ray Orchestra. In 1935 he began writing arrangements for radio programs starring Rudy Vallee, Ginny Simms and Jack Carson. By the 1940s he was writing arrangements and conducting orchestras in support of Ella Fitzgerald, Tony Bennett, Doris Day and Vic Damone. In the 1950s his *Music of the Century* band played at the Hollywood Palladium. Devol received Academy Award nominations for the scores he wrote for *Pillow Talk* (1959), *Hush Hush, Sweet Charlotte* (1964), *Cat Ballou* (1965) and *Guess Who's Coming to Dinner* (1967).

HAROLD A. DORSCHUG, 86, W1AST (ex-W8AST) (9-13-99) broadcast engineer. He began his career with CBS in New York City in 1935. Dorschug was one of two engineers on duty in Master Control the night of Orson Wells' famous 1938 broadcast of *The War of the Worlds* and was a member of the first CBS Television remote crew. From 1947 to 1955 he was Chief Engineer of WEEI (AM) in Boston. From there he moved to Hartford to become Director of Engineering at WHCT (TV) and WTIC (AM-FM-TV). Dorschug retired from WTIC in 1978 as Vice President of Engineering Research and Development.

ALLEN FUNT, 84, (9-5-99) the creator and host of *Candid Camera*. As a result of his experience as a radio writer and "gimmick man," he created *The Candid Microphone*, which aired on ABC (1947-1948) and CBS (1950). The program, which caught people off guard in bizarre situations, moved to TV on ABC in 1948 and became *Candid Camera*. It was carried on NBC in 1949, CBS from 1949-1950, NBC in 1953 and CBS from 1960 to 1967. *New Candid Camera* was syndicated from 1974 to 1978 and an adult version was carried on cable television. In 1989-1990 CBS aired a number of *Candid Camera* specials with Allen and Peter Funt as co-hosts. In 1992 CBS revived the show with Funt's son Peter as host. Peter and Suzanne Somers currently co-host the show.

DAVID A. HUFFMAN, 74, (10-7-99) computer science pioneer. He created the basic compression method used in transmitting and storing digital information. Huffman developed the "Huffman Coding Procedure," a method used today to compact the stream of 1s and 0s that make up digital information. Applications for

this method include fax machines, modems, computer networks and high-definition television. Huffman was on the faculty of MIT from 1953 to 1967. In 1967 he went to the University of California-—Santa Cruz, where he helped found the Department of Computer Science. He was Chairman of the Department from 1970 to 1973 and retired in 1994.

MILT JACKSON, 76, (10-9-99) jazz vibraphonist. The master improviser was a forty-year veteran of the *Modern Jazz Quartet*, and played with Dizzy Gillespie, Ray Charles, Thelonious Monk and others during a sixty year career. After service in WWII he joined the Dizzy Gillespie Band in 1945 where he became the first be-bop vibraphone jazz artist. He recorded several jazz classics with Gillespie, including *A Night in Tunisia, Anthropology* and *Two Bass Hit*. In 1952 Jackson joined the *Modern Jazz Quartet,* which broke up in 1974, but reunited in the 1980s and had its final performance in 1995. Jackson won a Grammy in 1969 for *That's the Way It Is*.

EDWARD ALFRED LEACH, 93, (7-7-99) radio engineer. Leach joined the General Electric Company in 1928 and worked at their facilities in Schenectady and Syracuse until 1945. Leach began GE's Transmitter Department (Schenectady) on January 27, 1930 and was the mechanical engineer at the installation of Crosley's WLW (AM) in Cincinnati, OH. The world's first super power radio station (500 kW of output power), it went on the air May 2, 1934. From 1945 to 1948 he as an Executive Engineer for Hammarlund Manufacturing in New York City. In 1948 Leach joined Sangamo Electric in Springfield, IL and remained with the firm until he retired in 1969 as Vice President of Sales and Administration.

DONALD MILLS, 84, (11-13-99) vocalist. He was the last surviving member of the singing group the Mills Brothers. The four brothers, who began singing together as youngsters, were known nationally by 1931. By 1981, the last year they performed together, they had made 2,246 recordings, possibly an all-time record. They were awarded 36 gold records, for million sellers, and sold more than 50 million records. Some of their hit songs include *Tiger Rag, Paper Doll, Glow Worm, Lazy River, Opus One, You're Nobody Till Somebody Loves You, Yellow Bird, You Always Hurt the One You Love, Cab Driver* and *Basin Street*. The Mills Brothers were also popular on radio and in motion pictures. Last year, The Recording Academy recognized the Mills family's contributions to popular music when it presented Donald Mills, as the surviving member, with a Grammy Award for Life Achievement. He had been performing as recently as last April.

RENE LECAVALIER, 81, (9-6-99) Canadian sportscaster. Lecavalier hosted the French-language National Hockey League games for Radio Canada for over thirty years. Lecavalier joined Radio Canada in 1937 as a war correspondent and from 1941 to 1952 he hosted cultural radio shows for the Canadian Broadcasting Corporation's French-language Division. In 1952 he became the radio commentator for the Montreal Canadiens and remained in that position until he retired in 1986. Lecavlier was inducted into both the Hockey Hall of Fame and Quebec's Sports Hall of Fame.

GENE RAYBURN, 81, (11-29-99) game show host and panelist. After WWII he and Dee Finch helped popularize the morning drive time format with their *Rayburn & Finch* program on WNEW (AM) in New York City. On television he was a regular on *The Steve Allen Show*, seen on NBC from 1956 to 1959, and its summer replacement *Steve Allen Presents the Steve Lawrence-Eydie Gorme Show* (1958). Rayburn is probably best remembered for hosting the daytime television quiz program *Match Game* which aired on NBC from 1962-1969 and CBS from 1973-1979 and the *Match Game-Hollywood Squares Hour* on NBC from 1983-1984. Some of his other TV credits include appearances as a panelist on *The Name's the Same* on ABC from 1953-1959 and one of several emcees on *Play Your Hunch* on NBC in the early 1960s.

GEORGE CAMPBELL SCOTT, 71, (9-22-99) actor. Scott is probably best remembered for his role as General George Patton in the film *Patton* and his refusal to accept the best actor Oscar for that performance on April 15, 1971. He performed with summer stock and regional companies before his break-through role came in 1957 in *Richard III* produced by the New York Shakespeare Festival. Some of his theater credits include *As You Like It* (1957), *Uncle Vanya* (1973), *Death of a Salesman* (1975), *Sly Fox* (1976). Highlights of Scott's film appearances include *The Hanging Tree* with Gary Cooper in 1959, *Anatomy of a Murder*, *List of Adrian Messenger*, *The Bible*, *Dr. Strangelove, or How I learned to Stop Worrying and Love the Bomb*, and *Islands in the Stream*. A sampling of his TV credits include *Omninbus* (1958), *East Side/West Side* (CBS 1963-1964), *A Christmas Carol* (1984), *The Last Days of Patton* (1986), *Mr. President* (FOX 1987-1988), and appearances on *The U.S Steel Hour* and *Hallmark Hall of Fame*.

JEAN SHEPHERD, 78, K2ORS (ex-W9QWN) (10-16-99) humorist. His storytelling captivated a large audience who listened to his

(continued on page 58)

BY BILL FIZETTE, W2DGB

A STRUCTURED APPROACH TO FIXING UP THOSE NICE OLD RADIOS

1 — Your Reference Sources

Bill Fizette needs little introduction because he is the president of our organization. For some time Bill has been interested in doing something to help the AWA reach out to newcomers to the antique radio hobby. This open-ended series of articles is one of the things he has come up with. It will continue as long as he has new material to contribute, or as long as folks continue to support the effort by sending him appropriate material to include.

The articles in the series will appear as they are developed, but its important to point out that "A Structured Approach...." is not a regular column. There will not necessarily be a new one in each issue of The OTB. *Those interested in contributing material for an article in the series—or even contributing a whole article to appear under their own byline—should contact Bill directly. He and I would also be pleased to hear from an individual would might like, eventually, to take on the assignment of contributing a regular column for beginners.* —MFE

Let's start this article with some basic assumptions, the main one being that you have somehow gotten the bug and really want to fix up some old radios that you have acquired, wisely or otherwise. Let's also assume that you know someone who does this, or have heard about it, and want to do the same. Also, it is a given that your knowledge of how to proceed is rudimentary at best, even though you may know a few of the basics, like the difference between solid state and vacuum tubes. Maybe you also feel that you are a klutz with tools. But you really do want to work on some old radios. So why not? Let's do it.

The idea for this series of articles came to me at our informal members' meeting held at the AWA Conference last september, One of the suggestions was that we should be more proactive in bringing newcomers into the hobby and providing guidance to get them started.

If you are a beginner, then, I will take you back to Course 101 in radio repair. If you already know all the answers, then the only reason for you to continue reading is to locate and correct my errors. For while I have "fixed" lots of old radios over the years, I have begun to realize that the subject is totally open...there appears to be no end to the learning. Comments are always welcome, as are contributions of techniques, information, and parts sources.

At any rate, let's get started. One of the very first concepts that I want to get across is that the book work...the reading and the research...is all important. There is the occasional person who can just look at an old radio and instinctively know what is wrong with it, but these folks are rare, and definitely not beginners. Furthermore, since most old radios have not worked in a long time, they are very likely to have multiple problems. Included in this list are components that have failed from age or abuse, compromises to the circuit made by incorrect service work or attempted redesign, and corrosion and changes in parts values as the result of less than ideal storage conditions.

You should try to build up a library of reference sources. One of the best buys that I made years ago was a set of *Riders Manuals* which, while they don't have diagrams of all the old sets, have an awful lot of them. These are large books and take up almost six feet of shelf, but they are well worth the cost and the space. Odd volumes (usually not whole sets) usually show up for sale at the AWA Annual Conference and other radio meets. Also keep your eye on the *OTB* classified ads. Antique book dealers can help you locate that elusive manual needed to complete your collection—though the cost may be higher. You'll often find such dealers in the *OTB* Business Card Ad section and you'll definitely come across them at most radio meets and our Conference Book Fair.

There are 23 volumes in all. The ones in approximately the first half of the set are those most needed by collectors because they cover the radios built up to the beginning of World War II—

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which most of us think of as the classic period of collectable radios. Rider's volumes are also available on CD ROM from various dealers—though clarity on the computer screen can't rival that of the printed page. Start collecting now and over a period of time you'll be able to accumulate what you need.

When I get a radio, the first thing that I attempt to do is find the circuit diagram. At the same time I can establish the year it was made. Then I make a working copy of the Rider's or other material, and set up a file folder on the set. Into this goes everything that I can find out about the radio, the circuit, the alignment information, the history of the set, where I got it and when, how much I paid for it, any manufacturer advertising, and so forth.

Another useful, and inexpensive, reference source is the series of "Most Often Needed" schematic of books by Beitman. Volume 1 lists the most-often-needed 1926-1938 radio diagrams. However, a mere half-inch thickness or so, it will never rival Rider's. This Beitman volume is often found at radio meets, usually as a reprint.

For amateur gear I also reference my own files of *QST* and *CQ* magazines, although these are secondary sources. And one of the best reference books that I have located is by Ed Romney, entitled *Fixing Up Nice Old Radios* (Where do you think I got the title for this series of articles?). Its 186 pages contain a wealth of basic information about the subject in general as well as techniques for fixing specific popular. It is well illustrated, and is a must reference source for any beginner.

Finally, the novice restorer/fixer should avail himself of the numerous specialty periodicals that are available. One is Antique Radio Classified, a monthly, and another is the quarterly publication you are reading right now. Through these you can link into where to buy materials, parts, books, etc. Also, don't forget the Internet, which is listing more and more reference material all the time.

The above list does not mention specialty reference sources such as the various amateur handbooks and basic radio books, and all sorts of listing books and price guides, all of which have their uses. But it is a starting point. And, if you can't find the diagram for a particular radio, individual schematics can be purchased from dealers who advertise in the above publications. Also, an old tube manual is a must...you can usually find one at a hamfest or perhaps someone in the local radio club has an extra.

Which leads me to one more point that can make a very big difference in how you succeed. Join a local vintage radio club if there is one available to you. You've already made a good move by joining AWA, which I assume you have done because you are reading these words. All sorts of avenues will be opened for you this way. Try to find someone who is willing to help and can guide you over the rough spots. In ham radio this person is known as an "Elmer." You'll find some real experts in some of the clubs; a note to the club president will identify them for you. Also, don't be reluctant to use E-mail. The AWA has its own reflector as well as a web page, and you can get the answer to most questions by simply using your computer. A good information source on the Internet is the ongoing column "On the Internet" in this publication.

In the next installment I will get into some basic philosophy of "restoration" (fixing up) of old radios and also discuss the physical set-up of the work area. You can do a lot of good work with some very inexpensive tools...all you need is the interest and the time.

NOTE: This material was originally prepared for the newsletter of the Carolinas Chapter of the AWA and is reprinted here, slightly amended, with the permission of Ron Lawrence, the CC AWA president. Our thanks.

OBITUARIES, *continued from page 56*

overnight broadcasts on WOR (AM) in New York City during the 1950s, 1960s and 1970s. Shepherd, without a script, would spin tales about his boyhood years in Hammond, IN, WWII experiences in U.S. Army Signal Corps and occasionally amateur radio. He also wrote for leading magazines and authored several books including *In God We Trust, All Others Pay Cash* (1966) and *Wanda Hickey's Night of Golden Memories and Other Disasters* (1971). Some of his other credits include hosting two travel programs on PBS (*Jean Shepherd's America* and *Shepherd's Pie*), appearances at Carnegie Hall and club shows, and writing the 1983 film hit *A Christmas Story*.

JASCHA ZAYDE, 87, (9-3-99) early radio pianist. For more than three decades Zayde performed on WQXR (AM) in New York City. He was the first staff musician hired by the station soon after it was founded in 1936 and hosted a weekly program called *The Development of Piano Music*. Later the station hired a second pianist, Clifford Herzer, and their weekly concerts soon

(continued on page 60)

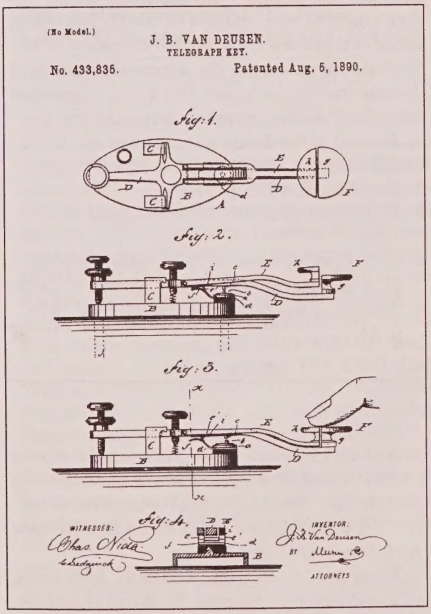
EDITED BY **ROGER W. REINKE**, 5301 NEVILLE CT., ALEXANDRIA, VA 22310-1113
PLEASE INCLUDE SASE FOR REPLY.

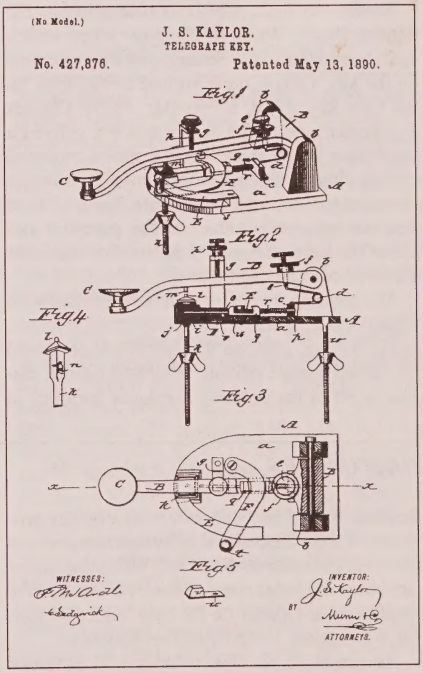
Circuit Closing Switches: Simple Wins

"It would surprise most of our readers if they could know how many ... supposed discoveries and inventions are being continually presented to ... Western Union ..., the majority of which will not bear an intelligent examination. And every new inventor comes forward with perfect confidence that he has finally solved the problem ... ."[1] While telegraphy was the means of communication in the last quarter of the 19th century, the number of telegraphic patent applications claiming the invention of a "better" key was nevertheless remarkable. Jesse H. Bunnell's steel lever key, patented in 1881, was about as uncomplicated and inexpensive a device as one could make for its purpose, but this did not deter the confident inventors.

Probably the largest proportion of applications during this period claimed new or improved ways of increasing transmitting speeds — semi-automatic keys, for example — or features that made key manipulation more comfortable over long duty periods. There were several patents granted for keys that made electrical contacts more reliable. Many of these inventors saw modest commercial success, in the sense that a recognized maker of instruments undertook the manufacture of their products.

The patent files also contain a number of grants for keys that addressed the problem of inadvertent failure to securely close the circuit after use. In contrast to other improvements, it seems that few makers were willing to explore the market for a key with a device that would do little more than the familiar, conventional circuit closer, like that on a Bunnell key. The use of an open circuit system would, of course, have eliminated the need for circuit closers.





Patent drawings for circuit-closing schemes by J.S. Kaylor (left) and J.B. Van Deusen.

European telegraph engineers used open circuit systems quite successfully, but that did not impress their early American counterparts. The different approaches to circuit design can be explained by the types of batteries used to power early telegraphic circuits. One English engineer, Culley, claimed that "the osmotic action in the Daniell battery ... is assisted by the current. This would seem to prove the wisdom of open circuits, by which the osmotic action would cease to the extent that it is caused by a closed circuit. ...Sabine, on the other hand, states that the entry of copper to the zinc chamber is faster when the circuit is open than when closed.... The apparent advantage of the American plan is in the fact that main batteries are only needed at terminal offices, while the open circuit system requires them at all stations."[2]

Once American closed circuit practice was in place, there seemed to be no turning back. But open keys in American systems could, and did, tie up circuits very effectively, much to the distress of everybody up and down the line. (Open circuit systems could suffer the same fate if some object was left resting on a key lever.) The conventional closer could *appear* to be secured, but in fact it could fail to make sufficient contact to ensure electrical continuity.

Some early makers offered alternatives to the regular closer; Watts & Co. sold a key with a split, two piece lever that engaged a lip mounted on the key's anvil, quite similar to the lever on the Cain key (*OTB*, November, 1997). Charles T. Chester, one of the earlier makers, offered a handsome key that included a spring-mounted circuit closer which brought anvil and lever-mounted contacts tightly together. None of these features apparently enhanced the purchase and use of the keys, judging by the number that have survived over the years.

The aspiring inventors were not satisfied with these options, however. A Pennsylvania inventor, J. M. Witmer, claimed that his invention would "... secure a more reliable safeguard against displacement of the ordinary horizontal turn key in use, so liable to become loose or displaced, and resulting in great annoyance to operators on that line by an accidental open or disconnected line wire."[3] Witmer's device involved a collar and rod arrangement mounted under the table's surface, along with a second "back key," which the operator had to use as he operated the regular key.

How all this resulted in greater reliability is left to the reader's imagination, because we cannot figure out how it worked, or if it did. Ten years later, J. S. Kaylor, came up with a sliding bolt, spring loaded, which caused the circuit closer to close securely even if moved a short distance.[4] Also in 1890, J. B Van Deusen added a second lever to a Victor key which would automatically close the circuit when released.[5] Patent drawings of the latter two keys are shown with this article.

It is reasonable to assume that these well-intentioned inventors did not spend eight or twelve hours a day pounding brass. Operating practices would not normally accommodate a circuit being closed every time the operator paused. To our knowledge, none of the keys described in the preceding paragraph were ever made — or at least none have survived over the years. One can perhaps understand Western Union's attitude toward unsolicited inventions after the Company reported that "An instrument for removing kite tails, dilapidated bustles, and similar appendages neither ornamental nor useful, from telegraph wires, has been patented by J. Walsh (197,067). The object aimed at is praiseworthy, but the efficiency of Mr. Walsh's invention, in the absence of practical demonstration, is to say the least, somewhat doubtful."[6] So too, complex circuit closers.

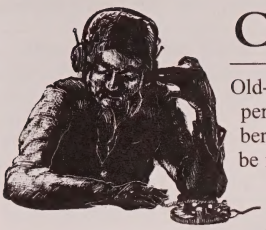
1 *Journal of the Telegraph*, January 16, 1878, p. 21
2 *Ibid*, May 1, 1875, p. 136
3 *U. S. Letters Patent 230911*, August 10, 1880
4 *U. S. Letters Patent 427876*, May 13, 1890
5 *U. S. Letters Patent 433835*, August 5, 1890
6 *Journal of the Telegraph*, January 16, 1878, p. 21

OBITUARIES, *continued from page 58*

became one of the station's most popular programs. Zayde stopped giving live performances in the 1960s in order to direct WQXR's educational activities and judge competitions. He was also the staff keyboard player for the New York City Ballet, a composer, and a Broadway conductor.

Information for this column was obtained from *Broadcasting and Cable, The Complete Directory to Prime Time Network TV Shows 1946-Present (4th ed.), The Encyclopedia of Jazz (lst ed.), The Hartford Courant, On the Air: The Encyclopedia of Old-Time Radio, The New York Times, QST* and *Variety*.

Thanks to Dr. John M. Anderson, John Dilks, K2TQN; Frank Q. Newton, Jr, W6SYG; and Dr. A. David Wunsch for additional source material.



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include as SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551**.

IMPORTANT!

OTB classified ads are now available for browsing in the "*OTB On Line Edition*" on our internet web site (www.antiquewireless.org). This practice will give members dramatically increased exposure for their ads.

SELL/TRADE—BC/SW TUBE RADIOS

Tube radios including Tesla, $70.; Stern, $50.; Murphy, $60.; Metz, $60.; Italian Var-Meccanica, $60. Argirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236 E-mail: aadam@it.teithe.gr

Have the following chassis for parts or working: Zenith 8B08, Philco 500, Zenith 10B1 for 10S669, Philco 625, AK-70, AK-L, Philco 37-650, Scott #601 11 tube with amplifier. Also Edison Console Diamond Disc phonograph, $150. Walt Wrabek, Rt. 4, Box 370, Menahga, MN 56464 (218) 564-4623

1930 RCA R-78 Radiola. 43½" high, 28" wide, 14" deep. Make offer. Ann Leitzel, R.D.#1, Box 368-A, Selinsgrove, PA 17870 (570) 374-9949

SELL/TRADE—COMMUNICATIONS GEAR

HQ160 Hammarlund receiver, good condition, no speaker, $150. or best offer; Heathkit HW20, good working order, $150. OBO; RCA signal generator WR508 with book, cable, etc., $50. OBO; Astron RS20M, good condition, $50. OBO; Heath Cantenna, $10. (castor oils); Heath HD1481 remote coax switch, complete, $25. OBO; MFJ 931 artificial ground, no longer needed, $75. OBO. Carl Watson, W1NV/G0VLW, P.O. Box 114, Boothbay, ME 04537-0114 (207) 633-3828 if no answer leave message on machine. Fax (207) 633-9745

Handheld xcvr, Yaesu FT-727-R, 2 meter and 440, three battery packs, accessories, $175. Leonard Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150

Hallicrafters SX-42 with R42 bass reflex speaker, including operator's manual and many factory service bulletins. It operates well and is very nice cosmetically, $225. Pickup only. George Hausske, W9OLE, 1922 E. Indiana St., Wheaton, IL 60187 (630) 668-3845

Viking II transmitter, $180., 122 VFO, $70., Collins 75A4, $725., National SW-3 with coils, $325. National SW-5 $300. Johnson Invader 2000. Carter Elliott, 1460 Pinedale Rd., Charlottesville, VA 22901 (804) 979-7383

SELL/TRADE—GENERAL

Victor RE-75 1929 radio/phono highboy, complete w/owner's manual, $250.; Sparton 7-36 radio/phono, very good cond., $100.; Stromberg Carlson TS-16-10M "Somerset" 16" TV, AM/FM/SW, 2 phonos, original and beautiful, $150.; numerous consoles by Amrad, Majestic, RCA, Philco and others. Most are priced between $60. and $150./BO. Malcolm Burdick, W1NOO, 156 Station Rd., Hampton, CT 06247 (860) 455-9640 before 8:30 pm

Eight Pilot Super Wasp coils, $99; set of 4-pin shortwave coils, $65.; Philco 118 B cathedral, $250.; Zenith pop-up, $30.; Acousticon tube hearing aid, boxed, $25.; Kadette Jr. parts set, $99.; Jensen 15" speaker, $40.; Mail-A-Phone recording blanks, $2. ea.; collection of twelve 2" and 3" electrostatic cathode ray tubes, $85 for all; Rider TV manuals Vol. I and Vol. II, television schematics 1938-1950, $50. for both. Many other radios and literature. SASE for large list. Bill Rolf, 30131 Center Ridge, Westlake, OH 44145 (440) 871-4547

British Ediswan coils (range blocks). I have a large quantity of these, new old stock, for use in the 1926/1927 Ediswan "One Valve Crystal Set,"

"Four Valve Long Range Radiophone" and "Toovee Set." These coils cover most wavelengths and are marked as such. Someone in the U. S. may just have a set which needs them! $35. for a full set or $12. for an individual unit, including postage. Want rectangular netal cover for two tube receptacle for Federal Model E Orthosonic. Fin Stewart, "Cockerdale" 380 Bulga Rd., Wingham N.S.W. 2429 Australia

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H-P 330-B Distortion Analyzer, Hickok Model U-10 Volt-ammeter (1917 Patent notice), HQ-129X, Globe Chief 90, Telco 2m converter, NCX-5 Transceiver w/spkr/P.S., other stuff including a lot of parts. SASE for list. Want Yaesu FP800HD, George Goldstone, W8AP, 1010 Burnham, Bloomfield Hills, MI 48304 (248) 642-7673

Parts, tubes, books, equipment. Two stamp SASE or email for list. Want large B-7971 Nixie tubes and sockets. Wayne LeTourneau, P.O. Box 62, Wannaska, MN 56761 (218) 425-7826 E-mail: wb0cte@arrl.net

SELL/TRADE—KEY & TELEGRAPH

Original blank Western Union Telegraph forms with attached receipt. Dated 1890's. Have limited supply, $6. each, postpaid. Herman Fothe, 5292 Tiffany Ann, West Palm Beach, FL 33417

About 15 bugs, early 20th century keys, sounders, relays. SASE for list. Dave Pennes, WA3LKN, 4607-C Santa Cruz Drive, Indianapolis, IN 46268-5354 (317) 471-9605 E-mail: dpennes@hotmail.com

SELL/TRADE—LITERATURE

1928-43 European radio schematics, more than 1300 pages, $85.; Old tube books: Sylvania, Tungsram, Telefunken, Puro-tron; Radio Tube Vade-Mecum, $26. "Toute la Radio" 1936 French magazine, 484 pages bound in one volume, $30.; Brochures: Marconi 1935, Loewe radio 1928, Geloso 1949, Valvo. All above are copies. Aargirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236 E-mail: aadam@it.teithe.gr

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New index to AWA publications (Old Timer's Bulletin, AWA Review, misc.), 1960 through Aug.1999. Formatted like the earlier versions but with new "Author" section. Has 63 pages, 8½" x 11" size. Gives 7000+ citations., $12. postpaid anywhere. (make check/MO payable to) Ludwell Sibley, 102 McDonough Rd., Gold Hill, OR 97525

ARRL Handbooks and other literature related to radio. Send SASE with 2 stamps for list. Also radios, parts, tubes and other radio related items for sale. What are you looking for? Ray Schmidt, 607 1st Ave. SW, Austin, MN 55912 (507) 433-0069

All editions of "Radio Handbook" (Editors and Engineers) and Radio Amateur's Handbook (A.R.R.L.) for trade. Want amateur radio equipment manuals, test equipment, manuals, catalogs such as WRL, Burstein-Applebee, Allied and others, and magazines Radio News 1944 and Radio Craft 1940 and 1944. A. J. Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (407) 351-5536 E-mail: ni4Q@juno.com

SELL/TRADE—PARTS

NIB NOS tested farm radio vibrators - 17 assorted 4 volt, 6 volt, 5 prong, 6 prong types, $35. for all, ppd; 2 tested (used) 6B4G tubes, $25 for both, ppd. Jim Farago, 4017 42nd Ave. South, Minneapolis, MN 55406-3528

SELL/TRADE—TUBES & TRANSISTORS

Old Soviet transistors, $40.-$70.; shirt pocket transistors in excellent condition, $30., with original box, $40. Argirios L. Adamidis, Kampouridi 19, Panorama, Thessaloniki, Greece 55236 E-mail: aadam@it.teithe.gr

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Good used 201A tubes ST or Globe, $14. ea., NOS ST, $20. Add $4. for S&H. Send for catalog or see www.fathauer.com. George H. Fathauer, 688 W. First St., Ste 4, Tempe, AZ 85281 (480) 968-7686

WANTED—COMMUNICATIONS GEAR

National NC303, Johnson Invader, Johnson Viking 6N2. Will pick up at a reasonable distance of Reading, PA. Dan Kernan, K3XR, 218 Balthaser Road, Sinking Spring, PA 19608 (610) 670-2980 E-mail: K3XR@juno.com

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TM's, Navy Receivers RBS-2/RBM-5, Signal Corps Receiver 174/URR. Robert Hartzel, 7459 Rodgers Ave., Merchantville, NJ 08109

Hammarlund HQ-120. Marc Ellis, 1914 Colfax St., Evanston, IL 60201 (847) 869-5016 mfellis@enteract.com

WANTED—GENERAL

Western Electric amplifiers: 25, 117, 124, 142, W.E. speakers, horns, drivers: 555, 594, 597, 713; W.E. tubes: 104D, 217A; UTC: LS19, LS20; Acrosound TO350, TO355. Ming Yang, 1995 University Avenue, #119, Berkeley, CA 94704 (925) 376-4220, E-mail: yang1240@aol.com

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Miller coils #242A (2 needed) and #EL56, schematic for vacuum tube Theremin, Pickett N-16 slide rule with instructions, US Army Signal Corps telegraph key J-38. Jim Dapkus, W6575

Dakota Ave., Westfield, WI 53964

Good escutcheon for Philco 42-355 or 42-390 (9 pushbuttons). An original or tracing of the back for an Emerson EP-375 ("5+1"). Herman Gross, 1705 Gordon Drive, Kokomo, IN 46902 (765) 459-8308 E-mail: w9itt@juno.com

Chassis or junker Arvin 517 tombstone. Restorable Philco 20 cathedral, 12" Alnico speaker for a 1940 GE console. Patrick Franzis, 235 Millville Avenue, Naugatuck, CT 06770-3848 E-mail: nlocj@arrl.net

Cathedrals and their cabinets. Rare and off-brand preferred. All considered. Please state brand, model, condition and price. Thanks. Ed Janssen, 730 Quail Circle, Lewisville, TX 75067 (972) 436-4722

Any Atwater Kent breadboard parts. Quote condition and price. Thank you. Paul Thompson, 340 Old Mill Rd. #247, Sanata Barbara, CA 93110

Need schematic to build a two (2) tube plug-in coil regen. radio using two (2) 117L7 tubes, one for the detector and the other for the amplifier. Want to build for my grandson. Raymond S. Fisher, P.O. Box 488, Charleroi, PA 15022 (724) 483-6703

Stancor/Chicago PCO/PSO 150, PCC55, PCC200; Triad HS-56, HS-29, HS50; Peerless S-217-D, E-372-Q, G-212-Q; UTC Y-6431, 6386 tubes; any audio equip. by Langevin or Fairchild. Have lists of old books and old hi-fi. SASE for list. R. Robinson, POB 1425, Wallingford, CT 06492

Pair of Crosley headphones. Have for trade W. E. and Baldwin phones or cash. Ross Smith, 1133 Strong Ave., Elkhart, IN 46514

GE X-371, X-372, Hallicrafters CR-3000, Ten-Tec 315, RX-10, Mosley CM-1, Heathkit AR-3, American Bosch 440T cabinet. Herman Schnur, 3205 Brick Kiln Rd., Greenville, NC 27858 (252) 752-2264

WANTED—INFORMATION

Museum personnel at the Buffalo & Erie County Naval and Military Park (NY) are in the process of restoring the emergency radio room aboard the USS The Sullivans (DD-537). They are looking for donations of radio equipment or any information on the operation of Fletcher class destroyer emergency radio rooms. Contact Paul Bernhard, Sr., at W2TU@mail.msn.com

WANTED—KEY & TELEGRAPH

Unusual telegraph items such as miniatures, left-handed bugs, oil break spark keys, etc. Gil Schlehman, 335 Indianapolis, Downers Grove, IL 60515 (610) 968-2320

Bottom of the line Vibroplex Zephyr. Looks like a Champion except for 3" wide base. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123 (724) 758-2688

WANTED—LITERATURE

The following QSTs to complete my collection: 1916 - Feb., Apr., May, June, Aug.; 1917 - Mar.; 1919 - Jan., Aug.; 1921 - Jan., Feb.; and 1922 - March. Ed White, WA3BZT, 809 Seymour Road, Bear, DE 19701 (302) 322-1313 E-mail: wa3bzt@wserv.com

RCA tube application note AN-135 (1948), original or copy. Larry Leslie, 3030 Rutgers Pl., Rockford, IL 61109 (815) 397-9595

Seeking OTB Volume 19-2. Greg Dockter, 414 Browning Avenue,

Manual/schematic needed for Ballantine Labs, Inc. Linear Video VTVM, Model 311, Serial Number P1. Bernard Klem, K2BND, 7669 County Rd. 36, Naples, NY 14512-9240 (716) 374-6829 Bismarck, ND 58501

WANTED—MILITARY

Parts wanted for restoration of an E. H. Scott "RCH" low radiation World War II shipboard receiver (see top of page 15, November 1992 OTB). Needed are the antenna box sheet metal (at the rear of the chassis) and the tuning dial with frequency markings. Also interested in a parts set if available. Steve Siter, 488 Marshall Street, Paxton, MA 01612 (508) 753-4870 E-mail: K1WGN@aol.com

WANTED—PARTS

Cabinet for Detrola Model 322 approx. 10" x 6" x 7". Karl Laurin, 811 Sally, White Oak, PA 15131 (412) 678-5406

Edison Primary battery parts or literature. I am interested in early Catalog/Brochures. Also, zinc plates or covers for early cells. Send a list of items and prices. I also have some components to trade. Ed Storey, 6216 La Posta, El Paso, TX 79912 E-mail: Enstorey@elpasonet.net

Flyback transformers for 1) 12" B/W Zenith part number 95-3208-01 and for 2) Admiral part number 79D166-3. James Maloney, 1703 Leno Rd., Macedon, NY 14502

WANTED—TUBE RADIOS

Seeking Crosley Model 59, complete receiver, or

chassis only (junker OK, but need good faceplate and knobs). Greg Dockter, 414 Browning Avenue, Bismarck, ND 58501

Norelco (Philips) "AM-FM Deluxe" Model(s) 6X3 ST 54 or 22 RL 789 44 multiband with transformer, instructions, aligned and working. Also White's Radio Logs from the 30s to the 50s. A. Sherry, P.O. Box 1051, Riverdale, NY 10471

WANTED—TUBES & TRANSISTORS

NOS globe shape tubes (all types) and Collector Tubes. Send list for offers. George H. Fathauer, 688 W. First St., Ste 4, Tempe, AZ 85281 E-mail: fathauer@home.com

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of $15.00 and it will seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for $50.00 and save $10.00 over the individual ad pricing.

Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA) to Robert W. Perry, "Smoke Signals," 131 E. High St., Painted Post, NY 14870. Closing date is six weeks prior to first day of month of issue.

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About Our
Feature Article Authors

PAUL JOSEPH BOURBIN
Genesis Revisited: The Commemoration of the First Wireless Message on the West Coast

Paul Bourbin has been interested in antique electronics since early youth. He collects everything from spark to transistor sets and enjoys repairing and restoring his acquisitions. He also has an outstanding collection of vintage paper, including books, magazines and service literature. Paul has served a five-year stint as President of the California Historical Radio Society.

WILLIAM B. FIZETTE, W2DGB
A Structured Approach to Fixing up Those Nice Old Radios

Bill, who of course is our current AWA president, has been interested in radio almost as long as he can remember. He received his amateur license in college, after completing his military service at the end of World War II. Over the past 17 years, he has given generously of his time to the AWA—starting when Bruce Kelley asked him to do an *OTB* article on the National HRO communication receiver. This evolved into his regular communication receiver column. Bill has also served a one-year hitch as *OTB* Editor and is a co-founder (with Bob Morris) of the *AWA Review*. He has served on the AWA board, and as one of the AWA vice-presidents, for several terms. He holds BS, MS and Ph.D. degrees in pharmacy and microbiology. Now semi-retired, Bill attempts to work on his receivers in between the other demands so well known to all retirees.

ROBERT L. GUNSHOR, W2LDM
Evolution of a 1922 MOPA Transmitter

Bob recently retired as a faculty member of the Electrical Engineering School at Purdue University in West Lafayette, IN and moved to his present QTH on Cape Cod. His most recent field of interest at Purdue focused on the growth of compound semiconductor structures.

Three years ago, after holding Extra Class call KD9B for several years, he decided to switch back to W2LDM, his original (1952) call. As a ham, his interests center around the beginnings of the "CW period" in the early 1920s. He enjoys constructing and operating the simple transmitters of the period using as many of the original parts as he can find—including, especially, original vintage tubes.

On the receiving end, he has always been fascinated by the breakthrough exemplified by the early National HRO sets and uses several in his shack.

KEN OWENS
Grid Leak Detection in 1920s Receivers

Ken first became interested in electronics and radio as a high-school student during World War II. By the end of hostilities, he and a friend were operating a thriving radio repair shop. Ken's career as a full-time radio tech ended when he entered college, eventually earning both a B.S. an M.S. in chemistry. Ken pioneered in the development of Mylar, working with manufacturers using the material in such applications as capacitors, videotapes and audiotapes. He became a serious radio collector in the 1980s, a few years after his retirement, and specializes in 1920s battery broadcast sets. Ken is active in the Central Ohio Antique Radio Association, and frequently gives presentations in radio theory and radio history.

JAMES P. RYBAK, W0KSD
Co-Author: Alexander Popov: Father of Russian Wireless

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low- earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital

photography and slow-scan television.

LEONID KRYZHANOVSKY
Co-Author: Alexander Popov: Father of Russian Wireless

Leonid Kryzhanovsky is a graduate of the Electrotechnical Institute of St. Petersburg (Russia) where Alexander Popov was first a faculty member and then Director. Now retired, Leonid was an information officer in a State-run electronics research institute and a freelance researcher at the Popov Central Communications Museum in St. Petersburg. He has published articles on the early history of electricity and on the origins of wireless telegraphy in Russia, Great Britain, the United States, France, and elsewhere.

MUSEUM *continued from page 68*

mally transfers ownership to the museum.

The committee now is working on moving all of the previous data, in various formats, into the main data base. Then, the task of database verification, a two year process at best, will begin. Excellent progress.

Hey… mark your calendars now for May 6th, the date for the AWA Spring Meet at the Annex. There is more information elsewhere in this issue, but briefly there will be an extended morning Flea Market, uninterrupted by the Annex auction which is moved to after lunch. The exciting Annex "junque" will be sold during the morning flea market and the better items (read Paragon, SP-600, audio tubes…), along with member items, will be reserved for the much improved after-lunch auction.

Flea Market spots are still only two dollars, admission FREE. Thanks to all of those we contacted during the AWA on-the-air activities. Listen for W2AN or W2ICE in other events.

Finally, I'll sign off for this time with the news that January, 2000, brings our first meeting with an architect to discuss plans for a new museum building. These very preliminary meetings will discuss the architect's duties, plans, fees, etc. My goal is to have a plan to present to the Museum Board on May 6th, with emphasis on building requirements for a public access building. Pretty exciting stuff!

Please feel free to contact me, President Fizette, or your favorite Board member with any ideas, concerns, or your willingness to help with any of the many phases of this project. See you in May! S'long from your museum crew.

Ed Gable, K2MP/W2AN
Museum Curator/Director

RECENT MUSEUM DONORS

Tom Ely W2ODW / *Misc. test equipment*

Frank DeSalvo / *400 RX & TX tubes, two 7" TVs, more*

Roger Halderman / *Tubes, two table radios*

Earle Sigler / *Sodium tube, cash*

Bob White / *Loran C locator system*

Sheldon Kane / *Nokia cell phone, Sams Photofacts, other documentation*

John Sawers / *Tube tester, tubes, components*

James Barden, Jr. / *Eight early telephones, CW key*

Ken Hope / *Philco TV, tubes*

David Browne / *Eight table radios*

Joanne Marsh / *Philco 42-1012 w/ Armstrong FM*

John Heinrich / *Early cell phones, shoulder bags, batteries*

Ed Gable K2MP / *Motorola Cell Star*

Don Taylor KB2BU / *Large collection TX tubes, Xfmrs, sockets, more*

Fred Norvik W2GH / *APR-4, Radar Rcvr, complete, AF osc, more*

Michael Schneier / *Early stereo with simultaneous AM/FM*

Allan Pellnat KX2H / *Book, WWJ Detroit News, 1922*

Harvey Cohen K2EJP / *CW key, bug*

Cliff Milner K2SKO / *Collins 30L1, TMC GSB-1, SP-600-JX21, more*

Tom Ely W2ODW / *Hallicrafters World-Wide Portable*

Anonymous / *Adams-Morgan Paragon RA-10/DA-2*

OTB Back Issues

The following back issues of *The Old Timer's Bulletin* are available at $3.00 each postpaid, with a 20 percent discount for six or more issues and 30 percent off for 12 or more. Index to *OTB* volumes 20-34 and *The AWA Review* Volumes 1-8 is free on request with purchase. Please indicate alternative choices when ordering back issues of *OTB*.

—VOLUME AND NUMBER —

25-4 Comet Pro/4-tube superhets/20s tuner
26-1 Cockaday Rcvr/Silver-Marshall/'29 Hartley XMTR
26-2 TTY Perforator/FB7 Receiver/McElroy Championship
26-3 Nation FB7 II/Radio in S. Africa/Mercury Super 10/ Building a 1929 Receiver
26-4 Gilfillan History I/ Sargent Model 11 Receiver
27-1 Gilfillan History II/Schickerling Tubes
28-1 Dynergy AC-Powered Radio/Pilot TC37 TV
28-2 '26 Radiomovies Today/National AGS I
28-3 Dowd Tube Collection/National AGS II
28-4 SE-1950 Radio Compass/National Sliding-Coil Receivers/Collecting Radio Batteries
29-1 Philco 17 Restoration/ZL2JJ '34 Station
29-2 Fada 460 Restoration/3ZO 1922 Station
29-3 Moorhead Tubes I/British '30s TV I
29-4 Moorhead tubes II/British '30s TV II
30-1 GE Octagon TV Set/TR-1 Transistor Clones
30-3 Military Equipment Special-17 pgs. of 48
30-4 Broadcast Receiver Special-12 pgs. of 48
31-1 1903 Ship Station/Spark vs ARC 1912/KWM1
31-2 Minimax/Spkr&Magazine Restoration/ Pushbutton Sets
31-3 Tube Special-19 pgs. of 48
31-4 International Special-11 pgs. of 48
32-1 Early SSB eqpt/AR188/BC-375/1915 Ship Spark XMTR
32-2 Restore 67.5 V Bats/A&B Pwr Sply/WWI Navy Equip.
32-4 Marconi V-24 Valve/HRO in British Army
33-4 Scott Special Rcvr/National Power Units
34-1 British crystal Sets/National Power Units
34-3 International Special II-20 pgs. of 64
34-4 Bell Labs Transistor Set/"Larkspur" Radios
35-1 Radiola and Aerola Grand/German WWII Magnetrons & Avionics/Tech-Manual Art
35-2 Van Horne Tube Co./Philco TV Designers/Foreign "HROs"/1200- and 1600-series tubes
35-3 Radiola 17 and 18/1929 regen/G&R Valve Co.
35-4 Negatron/Mercury Super 10/The Breting 14/James Millen Memorial Station
36-1 Orrin Dunlap's Lab/Kolster K23/Bush & Lane Radio
36-2 Headset Update Listing
36-3 100 Years of Marconi Radio
36-4 History of Rogers Batteryless Receivers
37-1 T.V.-Dr. Ernest Alexanderson, Part 1
37-2 T.V.-Dr. Ernest Alexanderson, Part 2
37-3 Evolution of the Auto Radio, Part 1
37-4 Reginald A. Fessenden and the Development of Radiotelephony
38-2 DeForest Gang Hits Colorado-Part1/Nathan Stubblefield-Forgotten Pioneer of Wireless-Part1
38-3 Early TV Gear/Mahlon Loomis/KWR-37
38-4 Rider VTVM/ Fr. Joseph Murgas/30s Antennas

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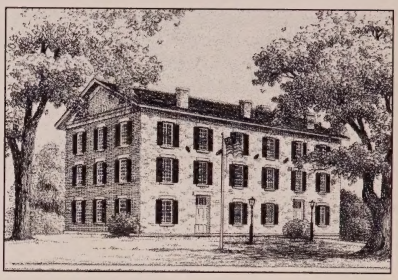

Mailing Address:
Ed Gable, Curator, AWA Museum,
187 Lighthouse Rd., Hilton, NY 14468
e-mail: k2mp@eznet.net

MUSEUM NEWS

Happy New Year to all from your museum crew. This writing precedes the Y2K changeover but I am assuming, with high certainty, that we are still here to read this and that no one fell from the sky or suffered weeks of candlelight and cooking on the backyard grill!!

The New Year brings a flurry of activity at your museum. First, we just completed a change in the wireless area at the Annex. Prior to this we had wireless period artifacts mixed with other items in every corner of the three buildings.

George Platteter, AA2FO, our famous shelf builder and wood worker, built floor to ceiling shelving, while the crew delicately moved one of the large glass display cases into the area. New spot lighting now highlights the Marconi 101 and other significant pieces.

The Library move is still in the planning stages with only unfinished budget items preventing this from starting tomorrow. This move will open greatly needed workshop areas to allow activity on the next priority, improved museum displays. Such displays for the May, 2000, opening include a greatly improved transistor radio display, a display of personal communications, a better display of early tubes, and more. Several museum crew members have taken on individual tasks and have chosen their own projects to work on.

Regarding the transistor display, we have some very nice items for it, but we do not have a Regency TR-1. If anyone would like to loan the museum such an item, or any other interesting transistor, I'd like to hear from you. Opening that up further, any member, with any interesting artifact that they would like to loan for display, should discuss such a possibility with me.

Working their fingers to the bone is the data base committee headed by Paul Norder, KG2EP. The new PastPerfect software is installed on the main computer and linked to three other PCs in various locations. All new acquisitions are now brought in and processed on the new system which automatically prints acknowledgement letters and the important Deed of Gift which for-

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